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# Contractors and Engineers Monthly

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## Highlights Of This Issue

### Bridges Recently Completed

Typical of wartime bridge construction are the two structures described in this issue. One, a 701-foot 8-inch concrete bridge on an important industrial access road in Georgia, was featured by the contractor's form work and well-planned pours to speed the completion of the job; the other is a 190-foot all-timber structure to carry the Alaska Highway over the Kiskatinaw River in British Columbia. See pages 1 and 21.

### Military Construction

A variety of construction for the armed forces is covered in articles in this issue. The contractor's care of equipment to keep it at maximum efficiency featured the work of grading and concrete paving of runways at an airfield in Louisiana. At another southern airfield, an extension of the sewerage system to care for additional personnel involved the construction of three pairs of concrete Imhoff tanks, featured by the use of wood instead of concrete baffles in the tanks. The grading, drainage and stabilization of runways at an Army Air Force training field are also described, while another article deals with the forms and concreting for fifteen high-explosives magazines at a Naval Air Station. See pages 2, 30, 46 and 55.

### Maintenance by Contract

The use of contractors' organizations to aid in maintaining our highways for the duration is becoming more and more widely accepted. In this issue, Kentucky's State Highway Engineer describes the type of maintenance done by contract in that state. See page 9.

### Post-War Plans

Both state and county highway departments are giving serious thought to their post-war road programs. Georgia's study of its post-war needs and approach to this problem are discussed in this issue, as are also the plans of Peoria County, Ill. See pages 26 and 66.

### IN THIS ISSUE

Airport Construction	2, 46
Bituminous Roads	9, 23, 38
Bridges	1, 21, 33
Care of Equipment	11
Cartoon	4
Concrete Construction	1, 2, 30, 55
County Road Work	2, 23, 57, 61, 64, 66
Editorial	4
Grading	14
Hangar Construction	17, 32
Highway Maintenance	9, 33, 38, 47, 56, 61
Highway Shops	11
Legal Decisions	34
News Photos	36, 37
Post-War Planning	16, 22, 26, 39, 66
Public Relations	53
Right-of-Way Acquisition	7
Sewage Plant Construction	30
Snow Removal	1, 57
Timber Construction	17, 21, 32
Traffic Striping	59



## Outguessing Snow On Indiana Roads

### Decentralized Maintenance Organization Fits Needs Of Hoosier State in Snow And Ice-Control Methods

U. S. 40, running east and west through Indianapolis, divides Indiana generally in half. The section north of this line is the one which usually has the most snow, "but the conditions have reversed themselves the last two years," reported Norman F. Schafer, Superintendent of Maintenance, during an interview on a hot day last summer. Like all other maintenance operations on the state highway system, the central authority is the Superintendent of Maintenance. (Concluded on page 28)

## Access Road Bridge Spans Georgia River, Well-Planned Pours

CARRYING falsework approximately 40 feet above a river bed without splicing the piles, using random lumber for bracing, and maintaining tight forms with but  $\frac{3}{8}$ -inch settlement is good in any man's language in these days of shortages in both men and material. But G. L. Strickler of Austell, Ga., did all that and more in erecting falsework, building the forms, and pouring the 701-foot 8-inch Chattahoochee River Bridge on a highway northwest of Atlanta, Ga., located to improve traffic conditions for a newly constructed bomber plant.

To insure continuous pours varying from 78 to 118 cubic yards in the superstructure, the contractor supplemented the service given by a commercial central-mixing plant, delivering in agitator trucks on an 8-mile haul, by installing a 2-bag mixer at the site. This insurance against breakdowns, flats, and traffic tie-ups also took care of the short periods between the arrival of the trucks, thus permitting continuous delivery of concrete throughout each pour.

### Design of Bridge

The bomber-plant bridge over the Chattahoochee River has five 40-foot deck and girder spans at each end, then a 40-foot  $7\frac{1}{2}$ -inch similar span, followed by a 65-foot  $2\frac{1}{2}$ -inch span with arched girders toward the central span of 90 feet. The approach spans are fixed at the abutments and at the south side for the first five piers from the south end, but have expansion on the

### G. L. Strickler, Contractor, Makes Good Use of 50-Foot Piles for Falsework, Tight Forms, Dual Concrete Supply

north side to pier 7 which has expansion for both spans resting on it. This is the south end of the 3-span continuous beam which is fixed at pier 8, has a rocker at pier 9, and an expansion joint at pier 10. The approach spans for the balance of the bridge are fixed at the south ends and have expansion at the north ends, the last span being fixed at the north abutment. The original design called for expansion at pier 8 and the continuous beam fixed at pier 9, but this was reversed when it was found that the foundation for pier 9 was not as good as pier 8. The footing for the former had to be carried down an additional 8 feet below the design depth of 3 feet to insure stability.

The bridge, designed for an H-20 loading, carries a 26-foot roadway with a 5-foot clear sidewalk raised 10 inches above the roadway on the east side, and a 14-inch curb on the opposite side. The sidewalk is located on the east side so that if, at a later date, a duplicate bridge is built to the west, the other sidewalk can be put on the west side, making the structures symmetrical about the common center line. The  $7\frac{1}{2}$ -inch reinforced-concrete deck is carried on five reinforced-concrete girders 1 foot 6 inches wide on the approach spans and from 4 feet 3 inches deep for the sidewalk girder to 3 feet  $5\frac{1}{8}$  inches deep for the three intermediate girders and the curb girder which vary slightly because of the crown of the deck. On the 90-foot span the girders are 1 foot 9 inches wide and vary from 3 feet 6 inches to a maximum depth of 9 feet at the piers.

The river piers, 8 and 9, as well as the adjacent land piers 7 and 10, have footings 34 feet x 7 feet 6 inches and 3 feet deep, except for pier 9 as mentioned above. The approach piers have rounded noses with web walls 1 foot 3 inches thick, while the river piers are solid with batters of  $\frac{1}{2}$  inch in 12 inches all the way up on both sides. The river piers are 37 feet  $7\frac{7}{8}$  inches high with a 2-foot cap surmounted by a coping of concrete 4 feet 7 inches x 18 inches to hide the shoes. This gives the appearance of the girders resting directly on the cap.

The only decoration for the piers is a series of fourteen  $\frac{3}{4}$ -inch V grooves, spaced 2 feet apart, with the bottom groove a maximum of 2 feet above low-

(Continued on page 6)

### UNUSUAL HANGAR OF WOOD AND GLUE



The laminated-wood arches for a new hangar at the Fairchild Aircraft plant were assembled in four sections with butt joints held by splice plates. See page 17.



# County Well Organized For Efficient Operation

## Dallas County, Ala., Set Up On County-Unit Plan, Makes Own Pipe, Standardizes Its Roads, and Thinks Ahead

† FROM finances to foundations, Dallas County, through the County Engineer's office at Selma, Alabama, plans ahead so that it knows where it is going. In finances, a small tax is now amortizing the 30-year-old County Road and Bridge bonds that have been hanging over the heads of county taxpayers for so long. As for the foundations! It has laid the foundations of good road building through the county-unit plan for all construction, has developed a well-organized and equipped bridge crew, and, by making its own concrete pipe, it is well along in solving its drainage problems.

### County Organization

The administration of highway affairs in Dallas County is on the county-unit plan. The County Engineer makes all purchases and operates the highway department on a budget which he prepares for the approval of the commissioners, with such amendments as they may desire. The department has been within its budget every year but two since this system was set up eight years ago. The two exceptions were when floods caused extra expenditures for replacing bridges and roads that were washed out.

The Court of County Revenues consists of four commissioners, elected at the same time for terms of four years, and the Judge of the Probate Court, ex-officio chairman. The commissioners each must reside in the district they represent but are elected by the county at large. One of the commissioners is elected from the county seat, Selma. The Court appoints the County Engineer for an indefinite period. The present incumbent, Lewis J. Moore, Jr., has held the position for nearly nine years.

Geographically the county is divided into three nearly equal parts by its two major streams. The Alabama River flowing from northeast to southwest cuts off about one-third of the county, the southeastern portion. The Cahaba River runs north from the Alabama and divides the remaining part of the county into two parts. It is interesting to note that all three divisions are approximately equal in area and in road mileage. Because there is only one crossing of the Alabama River, and this at Selma, and two crossings of the Cahaba, it is economical to divide the county into three maintenance districts so that equip-



The portable pile driver built by Dallas County, Ala., for the bridge crew.

ment does not have to be transported constantly long distances from one district to another.

The districts, known as 100, 200, and 300, use these numbers for designating roads in each district, starting with 101, and also for numbering their maintenance equipment.

For construction and bridge work, as well as resurfacing, all work is done on the county-unit plan out of Selma.

### Finances

County highway work is financed by the county's share of the Alabama state (Concluded on page 18)

## Standardized Timbers for Bridges, a Portable Pile Driver, and a Truck That Carries All Tools

(Photo on page 68)

† AN unusual amount of ingenuity has gone into the design of a truck for the bridge crew of Dallas County, Alabama, for it carries everything needed for any emergency or repair job on a timber bridge, with never a chance for the crew to say, "We left it at the shop". A portable collapsible pile driver and a well-conceived system of bridge design using the most economical timber for piles and structure add to the speed and ease with which Dallas County bridges are built and maintained.

### Timber Bridges

There are approximately 1,000 bridges of all types in Dallas County. Of these about 100 are concrete and steel, and the balance are all-timber structures. The standard bridge has a roadway width of 16 feet, and the lengths of the timber bridges run from one span of 15 feet to a multiple-span structure of 195 feet. The 15-foot span is standard for all-timber structures.

Timber pile bents of standard-size piles are driven to the required penetration and bearing for all bridges. The piles are all 8 x 8-inch treated timber 16 feet long and are driven for a 10-ton bearing. The standard 16-foot piles take care of a large part of the needs

of the county, but when a longer one is required, the standard lengths are spliced with treated 2 x 8-inch timber on all four sides with four ½-inch diameter bolts each way. The square ends of the timber and the splicing develop the full strength of the pile.

Bridge timber is also standardized, the most economical combinations of sizes being used. These sizes include: 8 x 8 for caps and piling, 4 x 10 for stringers, 3 x 8 for flooring, 2 x 8 for the bulkhead on the abutments, 4 x 6 for wheelguards and posts, and 2 x 6 for the hand-rail.

### The Pile Driver

To provide a pile driver that could be transported readily and quickly to any part of the county, a novel design was prepared so that only a few minutes would be required to set up the driver when it arrived at the scene of action. The base of the pile driver is a pair of runners of 8 x 8 timbers 16 feet long, using the standard timber of the bridge department. The leads are 4 x 6 I-beams, light-weight but strong because of the wide flanges and 20 feet long. These are bolted onto plates at one end of the runners and are held rigidly in position by a double A-frame of 2½ x ¼-inch angles with removable extensions to the tops of the leads. The front legs of the A-frames can be unbolted from the runners, the frames laid down on the runners, and the upper braces unbolted from the frames and swung against the leads as they are laid down on the runners. The cross ties between the upper braces from the A-frames to the leads make a ladder for the man running the cable through the block for the pile hammer.

A Jaeger single-drum hoist with a Hercules engine handles the 1,000-pound drop hammer. The hoist is fixed permanently at the opposite end from the leads. The follow block for the piles is made of an 8-inch length of 10-inch-diameter pipe with a 1-inch steel plate welded 4 inches from either end. It has a small hole in it to permit air to exhaust when a new wooden block is fitted to the top to receive the hammer blow. This block is of mock orange, a very hard wood, which is machined to fit the pipe section and has a slightly crowned top to fit the hammer. It is pressed into the pipe in a hydraulic press. Piling is slightly beveled before driving to fit the follow block and prevent brooming.

### The Bridge Crew Truck

The bridge crew consists of ten men and the Foreman, and their outfit is a well-equipped truck and a 2-wheel trailer pulled by the truck, the pile driver, and a trailer-type 5-S non-tilting Jaeger concrete mixer.

The truck is a 3-ton Dodge with a 10-foot Anthony flat steel body and a 10-ton hydraulic hoist. For normal use the truck carries two 6-foot steel tools

(Concluded on page 19)

## Good Equipment Care Speeds Airport Job

### T. L. James & Co. Operated Over 1,500,000 Truck-Miles Hauling Fill and Concrete At Kenner, La., Airport

(Photo on page 68)

† ONE of the most recent of the municipal airports to be completed for the CAA by the U. S. Engineer Corps is the Moisant Airport, at Kenner, La. There, a typical southern Louisiana swamp growth on land with but three contours, 1, 0, and -1, has been removed, and a large airfield with several runways and

taxiways has been created by T. L. James & Co., Inc., of Ruston, La. The spoil areas are so filled with pieces of old stump and rotted logs that they seem like a 50-50 mix of earth and wood.

The concrete paving outfit, which carried on after the grading crew completed their work, has run three straight years without loss of one full day caused by equipment breakdown. The whole crew thought their record was going to be wiped out toward the end of the Kenner job when a break did shut the job down, but everyone got busy helping the mechanics, and only three hours were lost. There is a very good reason behind this excellent record. In the first place, the contractor had a practically new outfit three years ago, but so did a lot of other contractors. The real answer is the complete check and overhaul of every piece of equipment between jobs and also checking every day the job is running. The temporary shop set up at Kenner was complete, with both gas and electric welding equipment; parts had been stocked well in advance of any possibility of their being needed; and replacements were made before the break occurred and not when the equipment was shut down. Lubrication played an important role in maintaining the equipment in action every day it was possible to pour.

This outfit paved the equivalent of 35 miles of 20-foot concrete highway at this airport alone in this the third year this equipment and men have worked as a unit. The Koehring 34-E TwinBatch paver averaged 2,100 feet of 9-7-7-9-inch slab 25 feet wide in 12 hours. The best day on the Kenner job was 2,460 feet in

(Continued on page 12)



The special body with tool boxes which make seats with backs for the bridge crew when moving from one job to another in Dallas County, Alabama.



C. & E. M. Photo  
The 375-barrel Johnson bulk-cement batching plant which was teamed up with a 300-barrel Blaw-Knox unit to serve the fleet of fourteen batch trucks for runway paving at a southern airport.



# SAVED for vital wartime traffic



Resurfacing worn concrete on State Trunk No. 31, south of Elgin, Ill. Center photograph shows TEXACO Asphaltic Concrete binder course on the right and the TEXACO Asphaltic Concrete wearing surface on the left.

With transportation a vital part of the war effort, worn-out sections of strategic highways must and are being corrected.

Take this section of State Trunk 31 in Illinois, for example. When it could no longer serve wartime traffic efficiently the highway department employed a type of improvement which has been used widely by many States, including Illinois.

After the worn highway had been primed with emulsified asphalt a 3-inch TEXACO Asphaltic Concrete pavement was constructed in two courses, each 1½ inches thick. A resilient, easy-riding, heavy-duty pavement is obtained at moderate cost, which will take hard wear for years with minimum upkeep.

When you plan your post-war highway program, make provision to resurface worn highways having adequate bearing strength with TEXACO Asphaltic Concrete. A TEXACO Engineer, who specializes in Asphalt construction, is at your service.



THE TEXAS COMPANY, Asphalt Sales Dept., 135 East 42nd Street, New York 17, N. Y.  
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# TEXACO ASPHALT



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## They Built Better Than They Knew

The amazing strength displayed by wood bridges in the southeastern section of the United States has led to surprise and confusion among state highway bridge engineers, the military services, and motor truck operators. Army and Navy motor-transport officers telephone to or call upon state engineers with the query "What do you mean by 8-ton loading?", being uncertain whether it applies to an axle, a wheel, or the weight of the vehicle, and posted load limits are frequently ignored by truck operators without disastrous effects.

Ten bridges we visited on one highway in the south are posted at each end "Load Limit 6,000 Pounds", a safe and reasonable limit beyond which the engineers won't bet on safety. Yet a month or two ago a truck loaded high with bags of fertilizer went across this string of bridges. A quick count of the bags and a simple computation from their known weight showed that the truck was carrying a load of 35 tons. It made the crossing safely and is still doing so regularly.

In another state, a bridge was marked "Capacity 8 Tons". Tank trucks regularly hauled between 5,000 and 7,000 gallons of gasoline for military use over this bridge. One day a driver ran the truck off the bridge and it landed right side up in about 2 feet of water. It was rescued by a pair of wreckers, each weighing 57,000 pounds, belonging to a nearby military establishment. They ran out onto the bridge, hooked onto the truck and raised it to the deck. A rather concentrated load, but the bridge took it.

Not always is traffic or the bridges so fortunate. A sturdy wood bridge was built six years ago to serve for two years during the construction of a new modern concrete and steel bridge. Misunderstandings, litigation and finally the WPB delayed the start of the new structure. One year and 363 days after the detour bridge was placed in service, a truck broke through the deck but without serious injury to truck or bridge. The damage was repaired and after six years this same detour bridge, carefully watched and maintained, is still in service, carrying approximately 3,000 vehicles a day.

A weakness of wood bridges which has to be watched most carefully, in addition to the fire hazard, is the deterioration of the piles caused by dry rot at the tops and by teredos and other borers in salt or brackish water. We recently saw an abutment pile, on which a new cap had been placed, that split the same day the planking was laid over the abutment sill. With a little pulling, the wood beside the split came away easily, revealing a completely rotted heart making the pile worthless for carrying any load. The various wood-preservative treatments aid in the solution

of this problem of deterioration of wood from exterior attack or rotting.

State highway department bridge and maintenance engineers faced with the problem of keeping old wooden bridges in service are frankly uneasy about the present carrying capacity of bridges ten or more years old and which should have been replaced several years ago, before the heavy military and war transport loads began to travel our highways. The miracle is that these bridges are serving so well with so few failures. Many engineers would gladly have replaced most of these wood structures with concrete or steel years ago, if finances and policy permitted. In one state, the continuance of wood bridge construction is based on the belief that it is cheaper to rebuild a timber bridge completely every ten years than to build a more lasting steel or concrete structure. In planning bridge projects, proper consideration should be given to both the first cost and continuing maintenance cost, in relation to the structure's service to traffic, when selecting the materials of construction.

The post-war years will see a large number of projects under construction to do away with many of these wood structures which have long outlived their known service life and are therefore hazards to highway traffic. Before they go, we salute these bridges and their designers who built better than they knew.

## Soil-Cement Mixtures For Base Construction

The seventh in the Highway Research Board's series of bulletins on wartime road problems deals with the use of soil-cement mixtures for base courses. The types of soil-cement construction described cover the incorporation of cement with subgrade soils, borrow soils, pit-run materials, and combinations of these materials by mixed-in-place, traveling-plant and stationary-plant methods.

Soil surveys, sampling and analyses, cement requirements, construction procedures, tests of compacted materials, maintenance, and reconstruction are some of the major topics discussed. Four appendices take up testing for moisture-density relations of soil-cement mixtures, wetting-and-drying test of compacted soil-cement mixtures, the freezing-and-thawing test, and determining the cement content of soil-cement mixtures.

A copy of this Bulletin No. 7, "Use of Soil-Cement Mixtures for Base Courses", may be secured without charge by interested contractors and engineers direct from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. The publication of this series of bulletins on wartime road problems is one of the contributions to the war effort being made by the Highway Research Board.

## Highway Development In Post-War England

The views of the Institution of Highway Engineers in England on the post-war development of highways in that country were reported in a recent issue of *Highway Abstracts*. "Since the road system of any country," says the Institution, "is the basis of all development and redevelopment planning, and is in fact the foundation on which the state of society is built and on which further progress depends, it is obvious that the future development of our highway system calls for immediate and earnest investigation if the efforts to achieve national reconstruction are to meet with success."

Points of particular interest in the Institution's plans are:

1. The main requirements of the re-planned highway system are that it should provide safe, speedy, cheap, and comfortable transportation of people and goods between the main centers of population and industry, wherever they now exist or where they will ultimately exist under the basic national planning scheme. In the opinion of the Institution, a road system which will fulfill these requirements is one which provides: (a) a skeleton network of high-speed roads to accommodate long-distance mechanical transport; (b) a secondary system of mixed-traffic roads connecting neighboring industrial areas and serving as feeder roads to the main high-speed routes, and as link roads connecting such routes and existing trunk roads on the outer ring of centers of industry and population; (c) local parkways accommodating all classes of road users from industrial areas to recreational centers; (d) minor roads to serve mainly local requirements.

2. It is the Institution's opinion that safety cannot be achieved if high-speed roads are to be made available for all classes of road users; therefore the skeleton system of high-speed roads referred to in 1 (a) should be reserved for motor traffic only, and there should not be access to them except at relatively infrequent intervals. All intersecting roads should be carried over or under them. These roads are referred to as "motorways".

3. In the final selection of any new routes, the utmost care must be exercised to keep in proper perspective the rightful claims of all sections of the community. It is clear that the main purpose of "motorways" will not be served unless the chief centers of industry and population are connected, but it is equally clear that "motorways" must of necessity pass through open country. It is true that one effect of this will be indirectly to facilitate the distribution of the produce of farms and rural industries and make the rural areas more readily accessible to the town dweller, but due attention must be paid to the safeguarding of the amenities of the villages and of the countryside, and the maintenance of flourishing agriculture. The new roads, then, must be planned as part of the countryside, and not made as ugly scars detracting from the natural beauty of the areas through which they pass. It is very necessary, also, that severance of farm properties should be avoided as far as possible.

## WPB Sends Out Appeal For Earth-Moving Units

Because of the critical coal shortage facing the United Nations, WPB's Construction Machinery Division has appealed for heavy-duty earth-moving equipment to be shipped abroad for use in new large-scale coal-stripping operations in the British Isles.

Since 90 per cent of America's construction equipment now being built goes directly to the armed forces, this appeal is directed to contractors, state and county highway departments, and used-machinery dealers throughout the country who are asked to sell some of their equipment to the Procurement Di-



"We call this preventive maintenance. It prevents the superintendent from overheating during 'down time'!"

vision of the Treasury Department, acting as purchasing agent for the Office of Lend-Lease Administration.

The machines urgently needed include 250 diesel or steam-powered shovels and draglines of 1½-cubic-yard capacity or more and 100 diesel-powered tractors with scrapers and bulldozers.

## Navy Needs Officers For Specialized Duty

The Office of Naval Officer Procurement has announced the continued need for commissioned officers to be assigned to general duties and also to duties of a highly specialized nature and for which a record of successful training and experience in various fields of specialization is prerequisite.

Among these specialized duties for which experience in the construction industry would provide the essential qualifications are: *carpenters for floating drydocks*, ages 25 to 50, with a minimum of six to eight years' practical experience in drydock work and a good knowledge of general carpentering; *inspectors of machinery*, ages 30 to 45, with executive experience in a responsible position in the purchasing and procurement of materials for contractors or manufacturers in the building, durable-goods, steel, or automotive industries; *ship repair*, ages 21 to 42, calling for graduate engineers who have had practical experience in the installation, repair and maintenance of machinery and equipment, in diesel engineering, in steel construction, in mechanical engineering, or in the construction, maintenance or repair of power plants, large motors and generators, and industrial electrical equipment; and *safety engineering*, ages 30 to 50, for duties in all phases of accident prevention in Naval shore establishments. Candidates for this category must have an engineering degree from an accredited college and at least five years' experience in a responsible position as a safety engineer, or have had two years' of satisfactory college work, ten years of successful practical experience and have attained a recognized standing in the profession.

In general, applicants for a commission or Warrant must pass a rigid physical examination; however, in connection with this program, defects which are not organic in nature and which are not likely to interfere with the performance of the specialized duties may be waived by the Navy Department. Applicants under 30 years of age who are physically fit for sea duty will be considered only for general service. The age limits given are not inflexible, but those outside the age ranges must have exceptional qualifications. Except where otherwise indicated, a college degree or a number of years of successful practical experience is required.

Candidates interested in these and other openings for general or specialized duties with the Navy may secure full information upon application to the nearest Office of Naval Officer Procurement. If uncertain of its location, write to this magazine and we shall be glad to send the address.



# Clearing AN AIRFIELD OF HEAVY TANGLED ROOTS WITH THE SEAMAN MIXER



PIONEERED  
by  
Seaman

The contract for the construction of a military airfield called for complete removal of dense, tangled and matted roots, — many two inches in diameter, — as part of the runway sub-grade preparation.

Thousands of dollars would have been spent in slow, tedious work if orthodox methods had been used — but the SEAMAN MIXER again proved its versatility in a new and unusual solution of this problem.

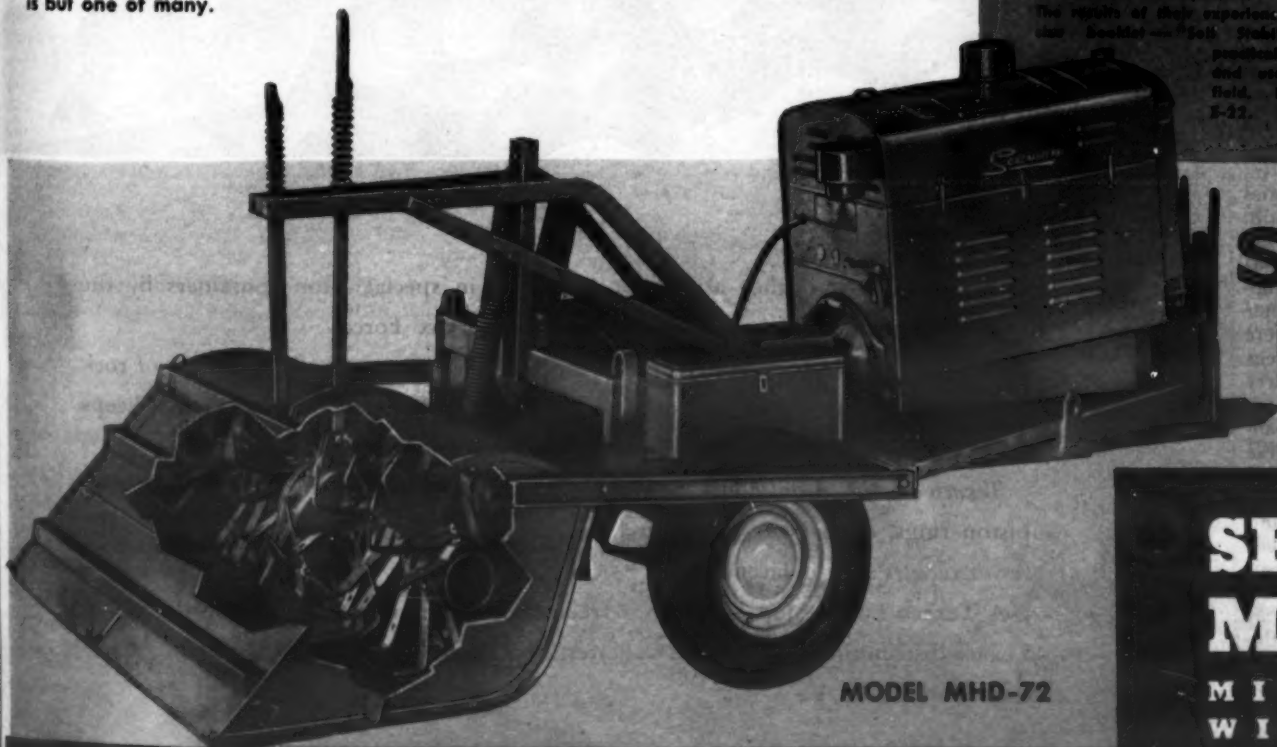
First, heavy disks cut roots into segments. Then two SEAMAN MIXERS went to work. With hoods raised as in aerating operations, the SEAMANS completely dug out the root segments to the required depth and left them on the surface, for removal.

That the SEAMAN MIXER does a more efficient job in pulverization and in-place mixing for soil stabilization is an accepted fact. Astonishing, however, are the new applications that are constantly being developed. Root removal is but one of many.

Showing hood-raised operation of the SEAMAN MIXER as used in clearing heavy matted root growth.

SOIL  
STABILIZATION  
METHODS

For many years, SEAMAN engineers have kept in close touch with soil stabilization developments. The results of their experience has been compiled in a practical booklet — "Soil Stabilization Methods". Written by practical men, it is filled with up-to-date and useful information for men in the field. For your copy ask for Bulletin S-32.



MODEL MHD-72

SEAMAN  
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MOTORS  
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WISCONSIN



## Forms and Runways For Georgia Bridge

(Continued from page 1)

water elevation. This horizontal notch or fluting is simple, easy of construction, and provides just enough break in the lines of the piers to relieve the usual monotony of such masses of concrete.

### Falsework

The contractor was fortunate in securing 50-foot piles which eliminated any need for splicing in the field. The falsework consisted of pile bents spaced 9 feet apart for the major portion of the span, and 6 and 4 feet apart at the piers where the weight was the greatest. Each bent consisted of six piles with the two outer piles battered to prevent sway. Each pair of bents was cross-braced longitudinally by heavy random lengths of timber, and each three piles in a bent were tied by a cross bracing. All braces and ties were fastened with two spikes at each crossing and at the ends, instead of with bolts which were not available.

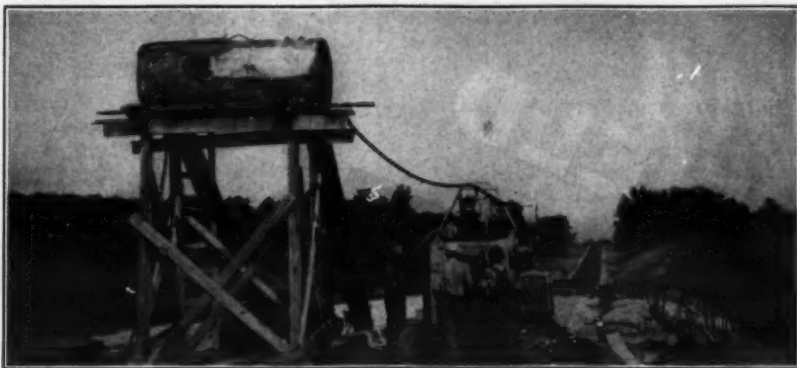
A walkway was built about 12 feet above the river on the upstream side and a craneway at about the same elevation on the downstream side for a part of the crossing from either bank. For the initial work, before the falsework was complete, the only crossing of the stream was effected by a small ferry run on a cable and canted by a hand-operated wooden winch for operation by the river current.

As soon as the falsework was completed, there began to be trouble with driftwood coming down on flood flows. This was cleared out at once by a P & H 204 crane on the upstream side of the falsework where the channel is close to the south bank.

### Forms and Runways

The forms for the girders or beams were carefully cut with a Novo saw rig at the site and assembled by a crew of twelve carpenters and forty laborers. The side forms were 1-inch tongue-and-groove boards with 2 x 6-inch studs spaced 16 inches on centers. The beam bottoms were 2-inch square-edge lumber with 2 x 6-inch studs also spaced 16 inches on centers. These were carried by two 8 x 12-inch timbers to the 8 x 12-inch caps on the bents. Wedges and take-up blocks assured the necessary adjustments before and during pouring to maintain the line and grade of the girders. At the 90-foot span the center was carried on six I-beams 30 inches deep and 30 feet long. The deck forms were built up the same as the beam sides. Small concrete blocks were used in the girder and deck forms to support the heavy reinforcing at the proper elevation.

The runways for the concrete buggies were well planned and sturdily built. In order to take care of the pouring from both ends of the 3-span continuous beam, two runways were necessary, running the full length of the three center spans or about 225 feet. These were built with pairs of 2 x 6-inch legs notched on either side at the top to carry a pair of 2 x 8-inch planks on end which supported the 2 x 8-inch stretchers spanning the 6 feet between horses. These six planks were so spaced as to provide a runway 6 feet wide with solid tracks at the sides for the concrete buggies and open spaces at the center to save lumber but not wide enough to permit an accident to the laborers pushing the buggies. A by-pass runway 6 feet wide and built in the same manner but with the ends of the planks lapping 6 inches over onto the two parallel runways and beveled to permit easy riding of the buggy wheels spanned the open space between the runways. It was picked up by six men and shifted quickly as the pouring



C. & E. M. Photo

To insure continuous pours on the Chattahoochee River Bridge, the contractor installed this 2-bag mixer at one end to supplement the concrete hauled 8 miles from a commercial central mixing plant.

required.

### Dual Concrete Supplies

The commercial fleet of agitator trucks which supplied the major portion of the concrete for all pours consisted of seven Jaegers, which made the 8-mile

trip from the plant to the bridge in 40 minutes. The two 2-yard, two 4-yard, and three 3-yard units in the fleet delivered the concrete to the buggies at the south end adjacent to pier 7, from which the concrete was wheeled to the proper points for pouring.

The supplementary concrete was provided by a 2-bag Jaeger mixer set up near pier 10 on the completed approach span deck. The stockpile of sand and crushed granite was spread 1 foot thick on the approach spans to distribute the load, and the two aggregates were separated by a 12 x 12 boom 64 feet long that had been used for driving the piles for the falsework. The 2-drum Jaeger mixer with a Waukesha engine was still in place on the deck where it had been left after driving the last of the falsework piles at the north end.

One wheelbarrow was used for sand and two for stone, and all loads for the mixer were weighed on a Fairbanks wheelbarrow batching scales. A Gould reciprocating pump on the bank of the river supplied the water, pumping to a 500-gallon tank on a frame near the mixer.

Concreting of the superstructure between piers 7 and 10 was divided into five separate pours. First the section over pier 8 and for a distance of 20 feet

(Concluded on page 58)



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Compressors are as necessary in the handling of war gas as in the operation of rock drills and other air-driven industrial equipment. Whatever the service, Texaco keeps compressors on the job, performing at maximum efficiency.

*Texaco Alcaid, Algol and Ursa Oils* assure wide-opening, tight-closing valves, free piston rings, open ports, clean air lines, maximum service life between overhauls, fewer repairs and replacements.

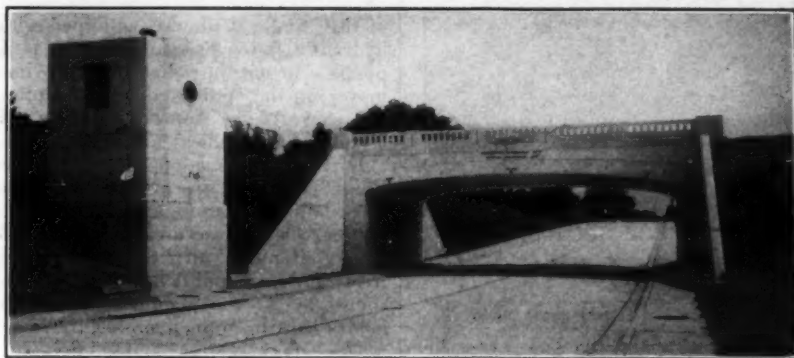
A Texaco Lubrication Engineer is freely at your service through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.



## F-M Pumps Control Underpass Drainage

Over a hundred years ago, long before the advent of the motor car, the Old Spanish Trail was an important overland route extending from St. Augustine, Fla., to San Diego, Calif. Today, U. S. 90, following the same general route as the Old Trail, is a vital link in our modern transportation system. Because of the heavy traffic carried by this highway during the past ten years, rapid strides have been made in a program to eliminate hazardous grade crossings.

One of the structures, shown in the illustration, is located at Cottondale, Fla., and carries the Louisville & Nashville Railroad over the highway at that point. Since the Cottondale underpass was constructed in flat country, drainage in time of heavy rainfall was essential. Two 8-inch Fairbanks-Morse vertical centrifugal pumps were installed and are always on guard against high water which might stop critical war traffic. Both pumps are driven by F-M 20-hp 900-



The Cottondale underpass on the Old Spanish Trail in Florida. At the left is the pump house, containing the two Fairbanks-Morse 8-inch units which take care of the drainage at this point.

rpm vertical ball-bearing motors, and each will deliver 2,500 gpm at 17-foot t.d.h. As a precaution against power failure, one pump is driven through an F-M right-angle gear connected to an auxiliary gasoline engine, and all are automatically controlled by a floatless type of control in the pump pit.

The Cottondale underpass is one of

many constructed in recent years by the Florida State Road Department as part of its highway modernization program.

*Waste paper is vital to the war effort. To produce many items needed by our armed forces, and to maintain the supply for newspapers and magazines, waste paper must be salvaged.*

## Land Acquisition For New Highways

**Old Out-Moded Procedure Should Be Revised and Simplified; Coordinated Action Needed**

By DAVID R. LEVIN, Transportation Economist, Public Roads Administration

† PRESENT public-acquisition policy for highway rights-of-way seems to have paralyzed current efforts to obtain the most efficient expenditure of public funds for transportation facilities, and in many cases may impede the execution of plans for post-war highway projects. A close examination of the legal, financial and administrative machinery by means of which lands are acquired for highways reveals striking inefficiency and obsolescence.

The continued existence and use of out-moded land-acquisition practices cannot be condoned but it is easy to understand how the aggravated condition came about. Along with the transfer of local highways to the state highway departments, the states fell heir to the already ancient laws dealing with right-of-way acquisition. The state laws and practices of appropriation of lands for public purposes represented the accumulations of more than a century and, except in isolated instances, little revision or simplification has been attempted. There is much wisdom in a periodic revision of the rules of policy and procedure, lest the substance be lost in a maze of arbitrary and confusing laws.

For some time, there has been agitation for reform of the mechanism by which the various states and their political subdivisions forcibly acquire lands for highway facilities. Reform is necessary, because inherent obstacles impede the modernization of the transport structure built up and maintained in recent years. Accordingly the Public Roads Administration has directed its attention toward an investigation and elimination of highway land-acquisition difficulties which in the aggregate constitute the so-called right-of-way problem.

### Some of the Problems

The diversity of land-acquisition methods, most of them time-consuming and expensive, is the primary obstacle. Many states still permit the burden of acquisition and financing of state highway rights-of-way to rest with local units of government, despite ineffective administration and financial incapacity. Tolerance of these practices has impeded the early realization of the benefits of needed public improvements. Tedious delays increase costs already burdensome, while untrained personnel are helpless to meet the challenge of new requirements. While population centers are growing very rapidly today, the law and the courts, unfortunately, move very slowly. This delay in action limits the power of state and local governments.

In a word, public authorities in many states cannot obtain land for highway facilities when they need it most; when they do finally acquire such lands, it is frequently found that they do not have enough, and that too much has been paid for what they do have. As a result, the functional obsolescence now characteristic of land-acquisition policy threatens to warp the growth of a highway system which might otherwise enjoy a wholesome development.

Properly planned and implemented with efficient land-acquisition machinery, a highway facility can supply a needed transportation medium, sharply increase adjacent land values, reduce commuting time to urban centers, and result in a low

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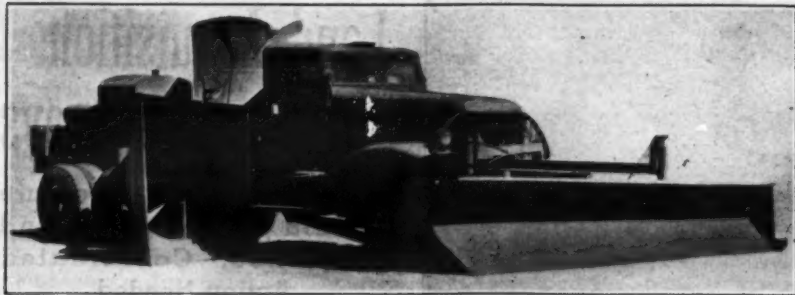


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- ★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.







The new Bros Rotary Widener, a combination one-way and rotary snow plow.

### New Rotary-Widener Snow-Removal Unit

A new snow-removal unit equally adapted for use on highways or airport runways was recently announced by the Wm. Bros Boiler & Mfg. Co., Road Machinery Division, Minneapolis, Minn. This Bros Rotary Widener is a combination of a one-way snow plow and a rotary. The front end is a moldboard plow, set at an angle of approximately 45 degrees, with a clearing width up to 15 feet. Its design provides straight-line snow discharge for a distance beyond the rotary, thus relieving the rotary of what would be excessive snow loads. The rotary unit has a clearing width of 3 feet 8½ inches and throws a constant stream of snow 75 to 100 feet beyond the unit, dissipating it thoroughly, to eliminate snow banks. The unit is self-contained and may be removed from the truck quickly and easily to make it available for other work.

The frame structure of the front-end one-way plow is of the girder type for strength without excessive weight. The hitch is of balanced-beam construction to provide rigidity and deliver strains to the push plates at the center of the truck. The manufacturer states that this type of hitch prevents any "jack-knifing" between the plow and truck. The rotary unit, placed behind the cab, enables snow to be thrown without interfering with the driver's vision, regardless of the prevailing wind. The chute is reversible, so that for road work the snow can be discharged to either side of the highway.

The Rotary Widener is designed to do a complete snow-removal job with one piece of equipment. At airports, it is possible to start plowing with the storm, beginning on the prevailing wind side, and clear an 18-foot strip at speeds of 10 to 15 miles an hour on the first pass, and approximately 15 feet on the next

few passes. On the last few passes, depending on the snow load, the rotary may be doing the job alone, dissipating the stream of snow widely over the field so that banks of snow are eliminated.

For clearing highways, the unit is equally effective, providing complete removal of the snow from the highway and shoulder. During very cold weather, when the truck can travel safely on the shoulder, it is possible to clear away drifts 40 inches from the edge of the shoulder, it is reported. The moldboard

of the front-end plow is equipped with hydraulic down pressure so that it is possible to put the weight of the prime mover on the cutting edge of the plow and shave frozen snow or ice from the surface of the highway or runway.

Further information on this Bros Rotary Widener, which has been in use since 1940 for both highway and airport service, may be secured by state and county engineers, airport managers and Army and Navy public-works officers responsible for the maintenance of airfields direct from the manufacturer.

### Accurate Grinding By Wet-Belt Method

A new accurate method of precision grinding that does not require highly skilled operators is being used in war work today and will be available for post-war service in state and county highway department and contractors' garages and equipment maintenance shops.

Wet-belt grinding is this newest meth-

od. It consists of a cloth belt, to which abrasive grit is plastic-bonded, operating over accurate platens at speeds up to 6,000 square feet per minute. On this Porter-Cable wet-belt surfacer each grain of abrasive acts like a cutter or tool, removing chips that resemble the chips from a lathe, shaper tool, or milling cutter. As each grit dulls it quickly refractures, presenting a new, sharp cutting point, or the grits may be resharpened by a star dressing wheel. The chips of waste material are constantly flushed from between the grits and the material being ground is cooled by water or other coolants.

A 32-page illustrated book, Form 630, has been issued by Porter-Cable Machine Co., 1714 Salina St., Syracuse 8, N. Y., describing this new precision machining method for shop superintendents who are now planning for post-war improvements in their equipment. A free copy of Form 630 will be sent promptly to those writing direct to Porter-Cable and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

## WHAT'S HANDIER THAN A

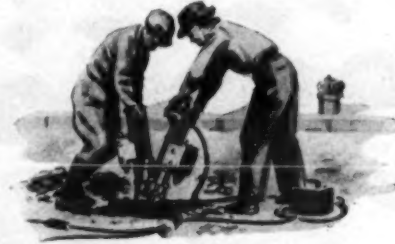
# Hammer?



ROCK BREAKING



DRIVING FIELD POSTS



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GROUND ROD DRIVING

There's nothing handier than a Barco Portable Gasoline Hammer . . . regardless of whether your job is a special one or whether it calls for regulation breaking, drilling, driving, tamping, or digging! Your Barco Portable Gasoline Hammer is a self-contained operating unit . . . low in cost . . . rugged in performance . . . portable under all conditions. Eleven special tool attachments are available to equip your Barco to meet your changing needs on the job. Write for additional information to: The Barco Manufacturing Company, Not Inc., 1817 W. Winnemac, Chicago, Ill.

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CLEVELAND 15, OHIO

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# Contract Maintenance On Kentucky Highways

**Resurfacing of 4,000,000  
Square Yards on Highways  
Done by Contract in 1943;  
Other Items Contracted**

By T. H. CUTLER, State Highway Engineer, Kentucky Department of Highways

(Photo on page 68)

IT is practically impossible at this time for the state highway departments of the country to anticipate what funds, labor and equipment will be available for essential highway maintenance for the duration. However, because of the necessity to conserve state-owned equipment whenever possible, in order to try to have enough machinery with which to carry on all essential routine maintenance until new equipment is available, this year the Kentucky Department of Highways has attempted to contract for practically all types of highway maintenance which is feasible by the contract method. Though a good deal of work had been let to contract by the Maintenance Division in years past, the necessity had not arisen heretofore for a concerted program to contract all possible maintenance items.

The maintenance work contracted in Kentucky this year includes bituminous-treatment work, both road-mix and plant-mix, costing nearly \$1,000,000; furnishing and delivery on the road, spread or stockpiled as directed, of approximately \$750,000 of replacement and floater-course material; cleaning and painting of several bridges; and patching with bituminous material and rock asphalt of one old rock-asphalt road section.

## Bituminous Maintenance Contracts

Sixteen maintenance group-project contracts for bituminous treatment of existing black-top roads were awarded in eight of the nine highway districts in Kentucky. This program covered approximately 370 miles of road with 4,000,000 square yards of surface at a total cost, not including engineering, of \$980,000. The treatment was applied at the rate of 75 pounds per square yard, with a small additional tonnage on some projects to strengthen existing surfaces and level dips.

The work is divided into two classes. Eight of the sixteen group contracts, covering 185 miles with 2,000,000 square yards of surface at a cost of \$514,000, were for Class F Type B surface. This type of surface is a bituminous-coated aggregate, plant-mixed and machine-laid, consisting of 65 to 75 per cent No. 9 coarse aggregate (nominal size No. 8 sieve to  $\frac{3}{8}$ -inch square screen) and 25 to 35 per cent No. 11 fine aggregate (nominal size No. 8 to No. 4 sieve) and MC-5 cut-back asphalt (SS-A-671a) with a base asphalt of 4 to 6 per cent in the mix. The prime is the same material as used in the mix.

The other eight group contracts covered 185 miles with 2,000,000 square yards of surface at a cost of \$466,000 for Class C-1 surface. This type of surface is

a mixed-in-place bituminous treatment using 75 per cent No. 9 coarse aggregate and 25 per cent No. 11 fine aggregate or concrete sand, with MC-3 cut-back asphalt (SS-A-671a).

Bids for this work were taken in April. The contracts were awarded to ten contractors and work orders issued in the latter part of May and early in June. Work was started on most of these groups in June and by August 1 was completed on five of the groups, with the entire program 52 per cent completed.

Due to the fact that we were able to program all of this bituminous-treatment work in the early spring and award the contracts before the beginning of the regular bituminous-treatment season, we were able to allow several months' time for the completion of each of these group



Laying 75 pounds of plant-mix per square yard on a maintenance group-project contract on a state highway in Boyle County, Kentucky. Note the transverse joint being finished and also the completed center joint.

contracts, but with the provision that no work would be permitted after October 15. This early letting and the long time interval allowed for completion have

been beneficial to the contractors and therefore possibly have been reflected in somewhat lower bids for the work. Further—

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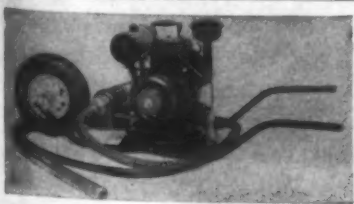
**Someday the Kid  
FROM THE ENGINEERS  
will Come Back**



WHEN he does, he'll have a story to tell. Impossible construction jobs accomplished in record time and under enemy fire. Equipment operated under tougher conditions than any contractor ever dreamed of. Facts about repairs that were made and many that were never required. He'll know the true value of shovels and cranes and we'll wager he can confirm the statement so often made about Lorain equipment—

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Preparing aggregate for a cantonment job in Virginia. The portable Cedarapids Morok crushing plant, owned by Hero Engineering & Construction Corp., of Buffalo, N. Y., is driven by a Caterpillar D8 tractor.

## High-Pressure Spray To Clean Equipment

Dirty equipment covered with oil, grease and mud is not only a sign of "poor housekeeping" but also is subject to sudden break-down and shortened service life. For this reason, equipment cleaning today takes on a new importance in the campaign to keep present machines working for the duration.

Among the equipment available for such service is the Aeroil line of compressed-air sprayers for applying solvents and cleaners to machines and parts and for paint stripping. These units consist of an all-steel welded spray tank tested to 300-pounds pressure, complete with a welded-on carrying handle, a 100-pound pressure gage, a 1-inch combination hand-tight bronze filler cap and air release, a safety valve set to 85 pounds, a valve connection with cap for the compressed-air chuck, a bronze needle valve, a length of special oil-resisting rubber hose, and a 22-inch brass spray bar with a special hand-release shut-off valve and spray nozzle. Available in two sizes, one with a 3-gallon tank and an 8-foot hose and the other with a 6-gallon tank and 12-foot hose, these Aeroil sprayers can be used anywhere compressed air is available, and will handle creosote, sili-

cate solutions, concrete curing compounds, insecticides, water paints and preservatives as well as equipment-cleaning compounds and solvents.

For field use on jobs where compressed air is not readily available, there is the Aeroil hand-pump spray outfit, in 1 and 1½-gallon sizes, which handles the same types of solutions and serves the same purposes as the heavy-duty compressed-air models. Vertical hand-pump spray outfits, also suitable for working pressures up to 100 pounds, are made in five sizes, from 3 to 20-gallon capacities.

Bulletin No. 204, describing and illustrating the various models of Aeroil spray outfits for equipment cleaning and similar services, may be secured by interested contractors and state and county highway departments direct from the Aeroil Burner Co., Inc., West New York, N. J., by mentioning this item.

## Bucket Care in Wartime

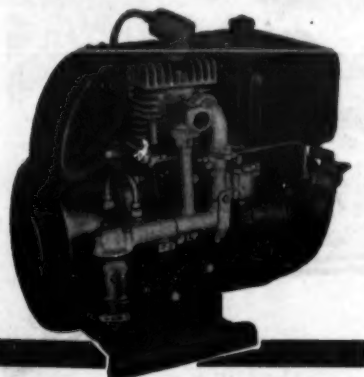
Three booklets, each on the care of a particular type of bucket, have been prepared and are ready for distribution by the Hayward Co., 32-36 Dey Street, New York 7, N. Y. Each booklet emphasizes

the importance of correct lubrication, frequent inspection, prompt replacement of worn parts and the necessity for proper adjustment of parts. Since buckets are made of urgently-needed metals, good care of them is both economical for the owner and an essential part of the war effort.

Copies of these booklets, which deal with clamshell, orange peel and electric motor buckets, may be obtained without cost upon application to the manufacturer, and mention of this review.

## Adv. Mgr. Appointed By Wickwire Spencer

The appointment of Charles B. Konselman as Advertising Manager of Wickwire Spencer Steel Co., New York City, has been announced, effective November 1. Mr. Konselman succeeds George L. Randall, who was recently commissioned a Lieutenant (j.g.) in the U. S. N. R. and is now temporarily stationed at the Naval Air School, Quonset Point, Rhode Island.



## ELECTRICITY For Any Job Anywhere



Awarded to each of the four Onan manufacturing plants

ONAN GASOLINE-DRIVEN ELECTRIC GENERATING PLANTS provide power and light for construction projects anywhere, for all applications where electricity is not otherwise available, and for emergency service.

They're doing war winning work on all fighting fronts.

Sizes from 350 to 35,000 watts, 50 to 800 cycles, 110 to 660 volts, A.C. 6 to 4000 volts, D.C. Also A.C.-D.C. models.

Your inquiry regarding present or past war needs will receive prompt attention. D. W. ONAN & SONS, 1236 Royalston Ave., Minneapolis, Minn.

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ELECTRIC PLANTS

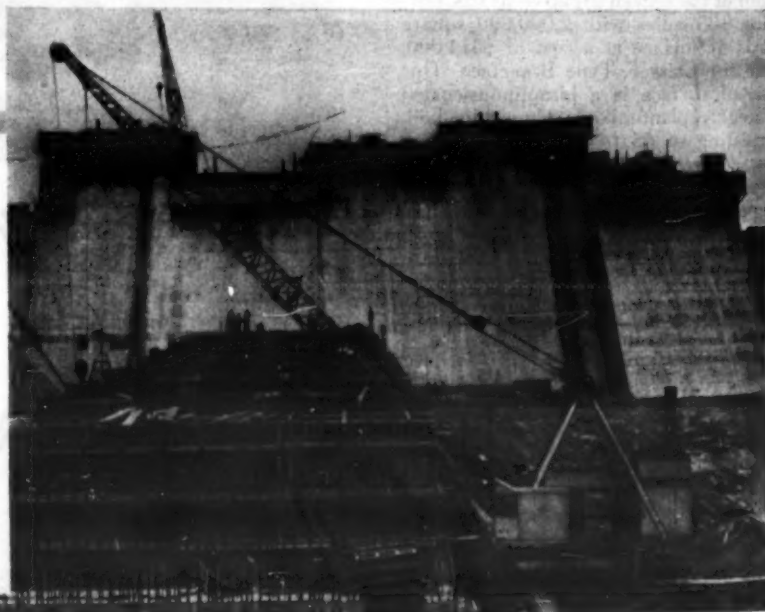


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Sinclair Pennsylvania and Opaline Motor Oils provide efficient engine lubrication under heaviest loads and continuous operation. Quality gear oils and greases save wear and reduce replacement costs.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)



Official U. S. Army Signal Corps Photograph

# SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 630 FIFTH AVENUE, NEW YORK 20, N. Y.



# Ohio Division Shop Proves Its Worth

Equipment Rebuilt and  
New Devices Created in a  
Shop With Only Average  
Tool Installation

(Photos on page 68)

LOCATED in the center of a highly industrial area, the Division 12 shop and garage of the Ohio Department of Highways were never highly tooled for equipment repairs. Because factories producing so much road machinery and trucks were close at hand, it was far easier and more economical to contract for repairs than to maintain a large shop and personnel. With the conversion of practically all local industries to war work, the Highway Shop has been forced to do all its equipment maintenance with the tools it had, in spite of which the repairs and rebuilding of equipment have proceeded smoothly.

## Some Recent Jobs

Probably the most important, and one of the greatest, contributions to the war effort has been the overhauling and repair of WPA equipment that has been sent in to this Division Shop prior to reshipment to Alaska or south to the Inter-American Highway for use by Engineer Troops.

An outstanding example of repair of state equipment was the rehabilitation of an old distributor in which the lower heating tubes were burned out. Because of the explosive character of the gases in the tank, the Garage Superintendent deemed it advisable to cut out the end of the flue tube with a cold point, leaving the baffles in place. The burned end was cut off and a new piece with couplings was electrically welded with three welds. Weld casing tubing was used, and when the repair was finished, the tube was pushed back into place with a plate on the outside so that it could be welded onto the head of the tank and the job completed.

Steel sign posts, no longer purchasable because of the war, are frequently damaged by trucks. These are collected by the maintenance crews and brought to the shop where they are heated in the blacksmith's forge and then pounded out straight over a square bar with a hooked end held in the anvil. This hand work does not take long per post and results in the return to duty of many posts that otherwise would be scrap.

New snow-plow shoes to keep the

blades off the road surface are made by cutting down old blades that have been used far beyond the usual depth, welding two or three blades together to form the shoe, and beveling the end for smooth running. One of our photographs shows an electric welder working on this type of repair.

Because the priorities available to a state highway department make it difficult to acquire new sheet plate, the small stock that was on hand at the start of the war was conserved and any additional secured for repair work has been used "down to the last drop". A scrap pile near the welding shop had pieces smaller than would have ever been saved in the old days. The men go to the pile and carefully select the sizes that fit into the job they are doing until the scrap that



C. & E. M. Photo

The yellow-brick building housing the offices of Division 12, Ohio Department of Highways, at Cleveland. The shop and garage building is the same size, located immediately behind this structure.

remains is too small for any conceivable use.

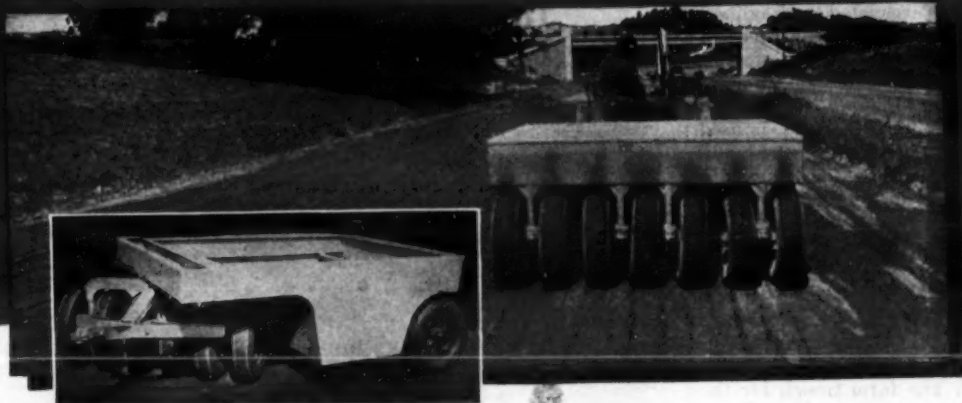
In line with the safety program of the Department, the shop has made 4-rung ladders with strap-iron hooks at the top for hooking onto the dump trucks so that the men working on them during sanding operations can mount the truck

safely without the usual dangerous climbing onto the tire and over the top. Every sanding truck, and that means every dump truck in the Division, is equipped with one of these ladders, and there is a reserve stock in the parts department.

(Continued on page 62)

# It's all in the Action!

VOIDS ELIMINATED—COMPACTION INCREASED  
with **BROS WOBBLE-WHEEL ROLLERS**



● It's all in the *action* of the Bros Wobble-Wheel Roller—a more efficient rolling method for the construction of bases and mats for roads and airports.

The uniform fluid down pressure of the pneumatic tire roller and its wobble *action*, work and knead the materials together, eliminating voids and compacting the materials to a stabilized, uniform density, from top to bottom and from side to side, with a surface free of ridges.

A firm, integrated durable foundation is created for roads, runways and flight strips. The mats they build have a smooth-riding, coarse-grain surface, which reduces skidding in wet weather. Bros

Wobble-Wheel Rollers are building important military and commercial air fields both here and abroad.

Since it's the *action* of the pneumatic tire wobble-wheel roller that does the work, and *not the weight*, only comparatively light loading is recommended. Maximum compaction can be obtained at speeds up to 15 miles per hour, or faster with less power consumption. You can do the job better, faster and at lower cost with the Bros Wobble-Wheel Roller. Complete information, illustrated and detailed, mailed on request.

ROAD MACHINERY DIVISION

**WM. BROS. BOILER & MFG. CO.**  
Minneapolis, Minnesota

# BROS Wobble-Wheel ROLLERS



## ASPHALT ★ MIXING PLANTS

PORTABLE  
and  
STATIONARY

★ Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, incorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. Write for Bulletin CE-260.

HETHERINGTON & BERNER INC.  
Indianapolis, Indiana

Hetherington & Berner



## Swamp in Louisiana Converted to Airport

(Continued from page 2)

13 hours.

### Grading and Drainage

The nearly mile-long runways 150 feet wide were poured on a 180-foot grade raised some 3 feet above the ground elevation by fills of "batture", pronounced locally as "batcher". This is a river silt from borrow pits on the river side of the levees. The selected fill was placed 180 feet wide and 3 feet high and then dropped off on a 1½ per cent or flatter grade to ground level, using field excavation. The fill was spread in 8-inch layers and compacted by sheepfoot rollers.

At the start of this job in June, 1942, it rained for the first 90 days, causing no end of trouble in getting the grading started. For a part of the first three months the water level over the entire field was at 0 so that a large portion of the field was actually under water. This area was cut up by old drainage canals, all of which had to be cleaned out, the muck and vegetation removed, and back-filled with acceptable material.

Drainage starts with 8-inch perforated concrete pipe at the edge of the runways and runs up to 54-inch reinforced-concrete pipe, using all sizes between. The field has a drainage canal on three sides, into which the various outfall lines deliver the drainage at an elevation of approximately -7. There is a total of 15 miles of drainage pipe on the job, most of which was laid at an average depth of 5 feet in trenches excavated by draglines. The excavated material consisted of about half-and-half earth and stumps. At present the drainage system, in addition to its proper function of removing subsurface water from the field, is used as a nursery for the raising of baby alligators by their parents. Many large alligators were killed during the early grading operations.

### Fine Grade and Forms

Fine grading ahead of form setting was done by a Model 6 LeTourneau scraper, pulled by a D7, to remove high spots, followed by a Caterpillar No. 112 power grader. The form trench for the 9-7-7-9-inch section was cut by a Cleveland Formgrader. Four men cleaned the trench by hand ahead of the form setters. As soon as the Blaw-Knox forms were set by the boss form setter and his crew of three men, a Flynn subgrader ran over the forms on steel plates on top of the forms, and also on the concrete slab for later runs, and cut the grade to the speci-



C. & E. M. Photo

Moving a Flynn subgrader back onto the forms after crossing a section of completed runway paving at a southern airport.

fied shape. Dirt was delivered to both sides, as the cut was too much to be handled to one side on a 25-foot width. This always piled up some dirt on the adjacent finished slab, but it was disposed of readily by blading and final brooming and blowing by a Littleford rotary broom and blower. A crew of three men lined up the forms while another oiled

them with a novel device. A concrete buggy was rigged with a small pump on top, and, using the buggy as a tank for the oil, the pump supplied the oil as a spray so that the man kept well ahead of the paver at all times. A Lakewood power tamper was used to consolidate the earth under the base of the forms to insure a good foundation when the heavy sub-

grader, and later the finishing machine, ran over them.

On this job, run under specifications of early 1942, with subsequent change orders, the expansion joints were placed every 105 feet, using ¾-inch precast fiber material set with a Nelson joint holder. Dummy joints were cut every 10 feet. The ¾-inch round dowels at the expansion joints were 18 inches long, spaced 12½ inches apart, and capped on one end.

The original plans also called for center steel across the longitudinal center joint and bar mats for all lanes, but this was altered by a change order to center steel only in the outside lanes, omitting the bar mats. The tie-bars were ¾-inch round deformed bars, 30 inches long and spaced 30 inches apart, carried at mid-depth of the slab on sheet metal stamped pins.

### The Batching Line-Up

The contractor built a spur track 4,000 feet long at his own expense to bring the  
(Continued on next page)

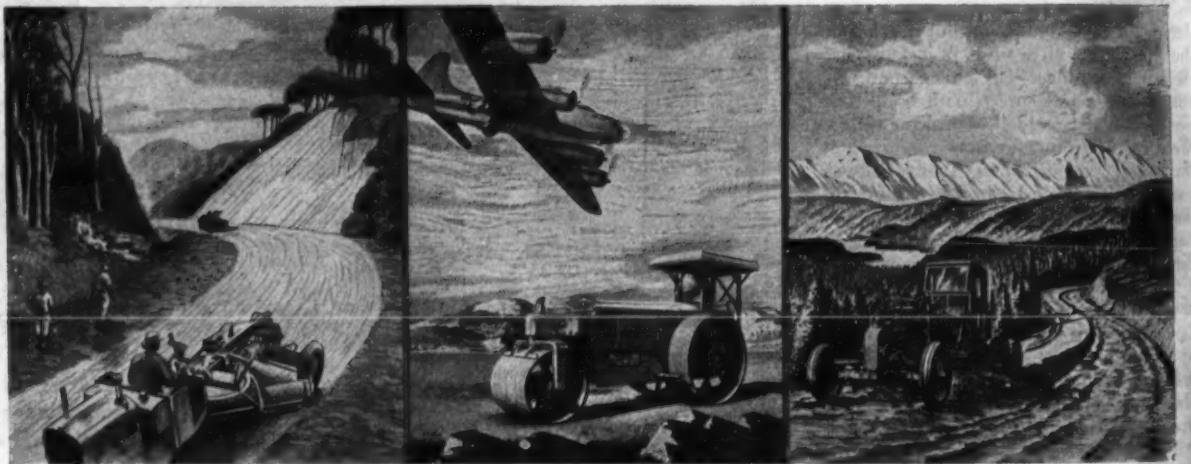


3-wheel  
Roller

# GALION

## FOR PROGRESSIVE ROAD CONSTRUCTION

In the March to Victory—In Post-War Planning

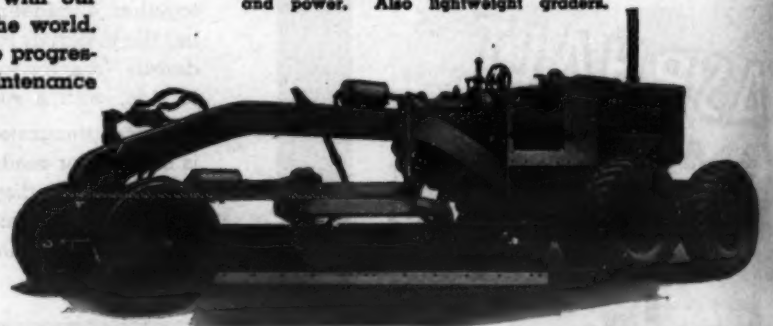


Galion continues to serve with essential road rollers and motor graders in all branches of the service.



Galion road machinery contributes to the all-out effort by serving with our armed forces in all parts of the world. Galion expects to contribute to progressive road construction and maintenance in the post-war period just ahead. Since 1907, Galion machines have provided top performance on thousands of jobs where speed, power, maneuverability and efficient operation are paramount. Remember Galion in your post-war planning.

No. 101 motor grader with maximum weight and power—No. 201 with medium weight and power. Also lightweight graders.



## THE GALION IRON WORKS & MFG. CO.

Main Office and Works: Galion, Ohio



Tandem  
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# GALION

Model NH5W with 4-30,000 C.P. floodlights.

The NITE-HAWK Gives You:  
**LIGHT**—Where you want it—when you want it.  
**POWER**—To operate hand tools—saws, drills, hammers, etc.  
Floodlight and Searchlight Units up to 14 million candlepower.  
Write for Bulletin 161  
**LISTER-BLACKSTONE, Inc.**  
1706 So. 68th Street MILWAUKEE, WIS.





C. & E. M. Photo  
A home-made spraying outfit with a Briggs & Stratton pump and engine used for applying membrane curing compound to the concrete paving.

## Batching and Paving At Louisiana Airport

(Continued from preceding page)

aggregates and bulk cement within the area of the airfield. On this spur he set up two aggregate batchers and two bulk-cement plants. The two Johnson aggregate batching plants with wooden bins were served by a Koehring 604 crane with a 13/4-yard Blaw-Knox clamshell bucket and a Lorain 40 with a 3/4-yard Owen clamshell. The batch trucks, each carrying two batches, selected the batching plant that was not busy or where the smaller number of trucks were waiting, so that the work was speeded in every way. This was better than having each truck assigned to a certain batcher, as the trucks might, through some shuffling when the men stopped for a drink of water or for gasoline, get lined up with all the trucks at one of the batching plants and none at the other. This arrangement made it possible to operate with only fourteen 2-batch trucks serving the 34-E paver with a haul of 3 miles round trip.

As the trucks returned from the paver, they stopped for a man to lock the tail-gate and also the gate between the batches. They then picked their batching plant, and after receiving the two weighed batches of aggregates, drove down the line toward the 375-barrel Johnson bulk-cement batching plant or to the 300-barrel Blaw-Knox bulk-cement unit. Between the aggregate and cement batching plants a man on an elevated platform stepped onto the trucks as they stopped, shoveled the aggregates into the corners of the body and dug a hole in the center to hold the cement and thus prevent loss by running out at the corners when the fluid cement hit the batch.

The aggregate cars were moved by a tractor that was handy, and at the cement batchers a Lidgerwood double-drum hoist powered by a gas engine was installed for moving the cement cars. Only one drum was used for this purpose.

### Double-Drum Paving

A 34-E paver operating at the pace set by T. L. James eats up a lot of water so that the water problem was just as great for the paving as it was when there was too much during early grading. A 4-inch Jaeger pump was set up in the drainage ditch at a convenient location and filled the two 1,500-gallon rectangular tank trucks as they returned from the paver. The paver pumped the water from the trucks to its reserve tank.

The paver was run on the shoulder adjacent to the lane being poured. This meant that the batch trucks operated on shoulders that were not too suitable as

service roads. A Caterpillar D8 with a LaPlant-Choate bulldozer was kept busy maintaining the shoulders and also pulling out trucks that ventured beyond the compacted selected fill.

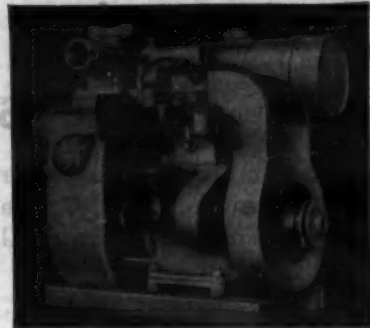
The 2-batch trucks were dumped at the paver by a man equipped with an aspirator to protect him from the constant dust of the cement. The batches were mixed 30 seconds in each drum of the Koehring TwinBatch paver and then delivered, one every 30 seconds, to the subgrade where four puddlers spread the concrete ahead of the two Jaeger-Lakewood double-screed finishing machines. A Mall vibrator was used as insurance against honeycomb at the keyways cast on all the inside slabs, and at the expansion joints. A Flex-Plane machine with the operator and a helper set the center-joint ribbon, 1/2 inch thick x 1 1/2 inches wide, in the slot cut by a wheel at the front of the machine, and a screed on the back of the machine finished the slab.

As the dummy joints were spaced only 15 feet apart, they came to hand very

frequently, so that it was necessary to have two extra men to cut them behind the Flex-Plane. They used a rolling bridge and a double angle with plow handles for cutting the slot and then inserted the two oiled steel bars to retain the slot during the initial set. Next came two men on another rolling bridge with a 12-foot channel-section steel longitudinal float followed by two hand finishers with 10-foot wood drag straight-edges. These same men used the 12-inch rubber belt, held in a pipe frame with a tie-rod at the top and turn-buckle to tighten it. The last of the hand finishers were the men cutting the expansion joints and the dummy joints and edges.

Curing was done by one man using two machines alternately from either side of the 25-foot slab. Each of the machines was a small rectangular welded tank with handles and two wheels, on the top of which was mounted a small Briggs & Stratton gas engine direct-connected to a small Briggs & Stratton cen-

(Concluded on page 40)



## High-Pressure Pumps

Light weight, high-capacity, self-priming

Unit 22HH, 11/2 in., delivers 65 gals. per minute against 50 lbs. pressure.

Unit 27 delivers 85 gals. against 70 lbs.

Unit 323 delivers 150 gals. against 100 lbs.

Suitable for fire fighting, jetting piles, jetting fish net poles, irrigation through high pressure nozzles and water supply where high pressure is required. Ask for Bulletin CEM-42.

## MARLOW PUMPS

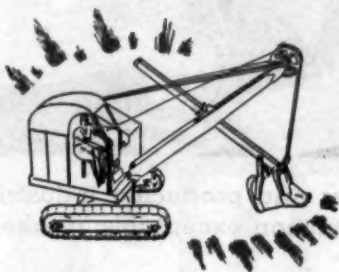
Ridgewood

New Jersey



# KEEP YOUR SHOVEL DIGGING FOR UNCLE SAM

Good maintenance is especially important today when new equipment is hard to get and existing equipment is called on for high-speed 3-shift service. Here are a few simple rules that may help keep your shovel digging more for longer:



★ Inspect machine at least every 6 shifts and tighten any loose bolts.

★ Fix troubles while they're still little ones. Don't let them grow.



★ Lubricate regularly, following manufacturer's instructions carefully.

★ Keep machine clean.

★ Keep fuel, lubricants and radiator water clean.



★ Try to lay out work and drainage so machine works on dry footing.

★ Do not "sweep" the pit by sideways dipper motion.

★ Do not start swing until dipper has been hoisted or retracted clear of bank.



# Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.



# Excavation of Muck Delays Florida Job

## Heavy Pumping Keeps Water Down, Dragline and Crane Remove Muck, and Clamshell Rehandles on Road Job

ON an access-road paving contract awarded to Ebersbach Construction Co. of Tampa, Fla., by the Florida State Road Department for 4.297 miles of 22-foot plain-concrete pavement 8 inches thick, three-eighths of the total excavation was "subsoil excavation" or just plain muck. Within the 200-foot right-of-way were two muck holes of unusual size for northern Florida, one 900 feet long with a maximum depth of 15 feet, and the other 1,200 feet long with a top width of 160 feet and up to 25 feet deep. The contractor worked in this second hole for over two months before it was cleaned out and the fill ready for paving.

This project, DA-NR-15(1), on State Road 21 northeast of DeLand, will provide improved access to a Naval airfield and is linked with another longer project close to Daytona Beach, training center for the Women's Army Corps.

### The Pumping Problem

During the rainy period the contractor for the DeLand project was confronted with a water problem which required a battery of four pumps in action sometimes for 24 hours a day. A succession of heavy rains in the area put a foot of water over the muck hole in a few hours if pumping were not continuous. Because of this and to insure satisfactory operating conditions immediately after a rain, the contractor ran the pumps continuously through all rain storms. The seepage of water from adjacent areas was not great, so that at other times the pumps could be shut down at night without any appreciable accretion of water. However, when there was rain, pumping was essential.

Four pumps were used for the major portion of the work, with a fifth as a standby, but which might well have been used had there been a good location to set it up. There was a 4-inch Goulds centrifugal, set up on a small barge with a Chevrolet heavy-duty truck engine for a prime mover, pumping from a sump at one end of the muck hole. Then a Gorman-Rupp centrifugal with a Hercules engine operated near the center of the job to take care of water that could not be drained to the floating unit because of constant blocking of the drainage ditch. A Domestic and a Barnes double-diaphragm pump completed the pumping contingent. The water was pumped over the bank into a small stream running near the muck hole.

### Excavating the Muck

The removal of the top layer of the muck was done by a Lorain 40 dragline with a  $\frac{3}{4}$ -yard Page bucket. This machine handled the driest material, casting it to the side where it was rehandled by a Koehring crane with a  $\frac{3}{4}$ -yard clamshell loading trucks which hauled

the muck to the Naval airfield for top dressing on the shoulders of the runways. The Lorain worked on mats because of the instability of the banks, while the Koehring was on solid ground beside the muck hole.

The Lorain excavated a strip 25 feet wide, which was followed by a Lorain  $1\frac{1}{2}$ -yard crane with a clamshell bucket, working on mats on the new fill and excavating to the bottom of the hole. Then, after the backfill had been completed, the cranes went back on it and excavated the balance of the muck at the sides.

In the deepest portion of the large muck hole, an unusual situation arose, with an equally novel solution. The first 18 feet of the muck came out readily by the methods described above, but



C. & E. M. Photo  
The sand backfill is pushed steadily forward as the muck is excavated for an access road near DeLand, Florida.

the last 7 feet had become so stirred up

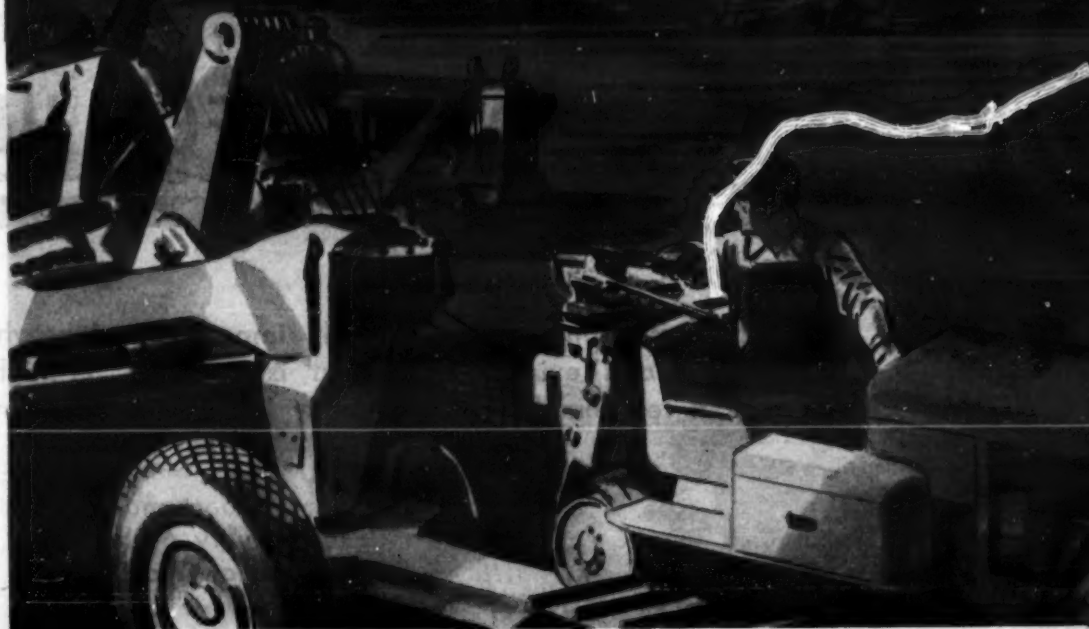
by the action of the bucket that it could not be handled by the clamshell, and still it was not sufficiently liquid to be removed by the pumps. The contractor dumped in sand fill to give more body to the semi-liquid mass and then clammed it out easily. This was done at his own expense, as the payment for excavation was by the yard based on the cross-section of the muck hole.

### Backfill

Sand borrow for backfilling the muck hole was hauled a distance of about 1,000 feet from a nearby pit. A fleet of five LeTourneau scrapers, three 11-yard and two 8-yard, pulled by D7 tractors, was used for the backfill operation. These delivered the sand immediately back of the Lorain  $1\frac{1}{2}$ -yard clamshell, and then it was pushed forward by one of a pair of LaPlant-Choate bulldozers on D7 tractors. When the fill was ready to be carried ahead, the crane moved out, and the accumulated pile of sand behind the crane was quickly pushed

(Concluded on page 31)

## THEY KNOW THEIR BUSINESS



Operating a carrier and producing industrial friction materials have nothing in common except this: it takes "know-how" to do either job right.

38 years experience has given Raybestos the essential "know-how". Raybestos means: 1) correct and dependable brake linings and frictions, specially engineered to meet the exact requirements of every machine that you operate; 2) friction materials that actually improve the original performance of older industrial equipment; 3) a single source of supply for all your needs; 4) fastest deliveries through your local Raybestos distributor. Specify Raybestos — now.

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## INDUSTRIAL FRICTION MATERIALS

FOR SHOVELS • CRANES • HOISTS • TRACTORS & EARTH MOVERS

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**Combination  
Pruner & Saw**  
AVAILABLE  
ON PRIORITIES  
EASILY CARRIED IN  
SMALL CAR OR MOTOR-  
CYCLE

Length	Weight
30 in. Pruner	2 1/2 lbs.
30 in. Saw	1 1/2 lbs.
48 in. Section	1 1/2 lbs.
48 in. Section	1 1/2 lbs.
Total Weight	7 lbs.

This combination can be quickly and easily assembled to make either of these two tools:  
1 Heavy Duty Tree Trimmer (3 1/2" capacity)  
2 Fast cutting Pole Saw 10 1/2 ft.  
If longer lengths are required, specify extra sections 6 or 8 ft. long, or additional 3 ft. sections to make the necessary length.





The new Merrill Bros. tool for opening drums.

### Drum-Opening Tool Saves Drum, Time

Operating on the simple principle of a household can opener, the new Merrill Brothers drum-opening tool is designed to preserve drums for re-use, to save time, and to prevent hand injuries. In one quick easy thrust, it firmly grips the outside of the drum and cuts smoothly and evenly, folding the cut edges in close to the drum.

Especially adapted to opening drums used for shipping lubricants, chemicals and similar materials, this drum-opening tool is made of steel drop forgings, hardened and tempered, and can be resharpened when necessary.

Descriptive literature on the tool and its uses may be secured by interested contractors and state and county highway departments direct from Merrill Brothers, 36 Caspian St., Maspeth, Brooklyn, N. Y. Just mention this item.

### Diesel Engine Oil

Designed to overcome the problems of varnish and sludge formation, metal corrosion and ring sticking, Amalie Pennsylvania H-D special oil for diesel-engine lubrication is Proto-Processed from Pennsylvania crude to provide high film strength, proper oiliness, and heat resistance. The Proto-Process by which Amalie H-D special oil is refined removes by selective filtration the undesirable components of the crude and none of its valuable ones including natural oxidation inhibitors. For this reason, sludge formation is retarded, thus extending the life of parts and engine.

Another problem to be met by a diesel-engine oil is that of ring sticking. This results from either the improper type of fuel oil or improper working conditions in the engine so that an excessively rich mixture of fuel oil results in smoke, soot and gum, and, eventually, ring-sticking. Amalie H-D has a special detergent or washing action designed to prevent ring sticking, and the compounds which form "varnish" or "lacquer" on cylinder walls or rings are removed during the Proto-Process.

The features of Amalie H-D heavy-duty diesel oil are given in a new booklet on lubrication recently issued by the Amalie Division which also includes valuable information on the lubrication of a wide variety of equipment used in road construction, earth-moving, excavating and land-clearing operations. Copies of this booklet "Lubrication Data on Contractors' and Agricultural Equipment" and further information on the full line of Amalie lubricants may be secured by interested contractors and engineers direct from Amalie Division, L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.

### Safety Council Elects 1943-44 Section Officers

At the Thirty-Second National Safety Congress, held in Chicago in October, the various membership sections of the National Safety Council elected their new officers for 1943-44. Those for the Construction Section include: General Chairman, G. O. Griffin, Safety Director, Dravo Corp., Pitts-

burgh, Pa.; Vice Chairman for Building Construction, Lloyd A. Blanchard, Chief, Safety & Accident Prevention Branch, Corps of Engineers, U. S. Army, Washington, D. C.; Vice Chairman for Heavy Construction, E. A. Blanpied, Safety Engineer, Kansas City Bridge Co., Kansas City, Mo.; Vice Chairman for Highway Construction, Lester D. Wise, Safety Director, Pennsylvania Department of Highways, Harrisburg, Pa.; Secretary, Roy A. MacGregor, Executive Secretary, Constructors Assn. of Western Pennsylvania, Pittsburgh; and News Letter Editor, Edgar N. Goldstone, 232 30th Ave., San Francisco.

W. A. Hazard, Engineer of Erection, Bethlehem Steel Co., Bethlehem, Pa., and R. J. Reigeluth, Treasurer, New Haven Trap Rock Co., New Haven, Conn., both past general chairmen, will serve as the Advisory Committee. Committee Chairmen will be: Engineering, C. H. Black, Stone & Webster Engineering Corp., Boston, Mass.; Membership, Milo E. Smith, Chicago Bridge & Iron Co., Chicago, Ill.; Program, F. J.

Crandell, Liberty Mutual Insurance Co., Boston, Mass.; and Visual Education, Thomas M. Webb, Bridgeport Brass Co., Bridgeport, Conn.

### New Pipe-Tools Catalog

The 1944 catalog, fully illustrated and indexed, covering the entire line of Beaver pipe cutters, threaders, reamers and similar tools and machines, is now

available for distribution. All prices conform to the OPA Price Regulations, and it is noted that a number of downward price changes have been made. A condensed form of the catalog, for use in the loose-leaf books of jobbers' salesmen, is also available.

Copies of both the complete and condensed catalogs will be sent to those interested upon application to Beaver Pipe Tools, Inc., Warren, Ohio.

## MONDIE DROP and UPSET FORGINGS FOR CONSTRUCTION EQUIPMENT

Such as Dipper Teeth, Trencher Teeth, Gear Blanks, Levers, Tie Rods, Cranks, Crank Shafts, Special Shapes, etc. Forging weight range from 1 to 50 pounds.

Inquiries given prompt attention by our Engineering Dept.

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### Use Your Hough Shovels in More Ways!

They'll handle pipe, poles, rails and culvert—Load machinery and heavy parts on trucks—Haul and dump mixed concrete—Set fire hydrants and lighting standards—Charge concrete mixers, asphalt plants and black topping machines—Pull poles, posts and shoring—Quickly load gondola cars with shingle ramp. They've hundreds of applications, saving time and money on every job!

### Lots of Life in the Old "Baby" Yet!

If you can't get a new Hough Shovel, grab a rebuilt unit. It'll pay off well if properly maintained, and maintenance is simple.

Keep clean oil in the hydraulic system at the proper level . . . Flush entire system every 400 hours . . . Use bucket teeth for digging clay and shale . . . Keep bucket cutting edges sharp for fastest digging . . . Use special width buckets for rehandling and light material loading (your dealer has details) . . . Shorten snap chains to increase dumping height on free dumping materials . . . Hardface weld the bucket cutting edges for maximum life . . . Lay your job out to do as little turning as possible; it extends crawler life . . . Don't turn in soft-going—run straight across the job . . . Use only a bulldozer blade for all backfilling and bulldozing jobs.

Hough Shovels are built to serve you well. They will, with ordinary care and attention.

**THE FRANK G. HOUGH CO.**  
Libertyville, Illinois







## Unusual Hangar Of Wood and Glue

Laminated-Wood Arches  
Feature New Structure  
Recently Completed for  
Fairchild Aircraft

(Photos on pages 1 and 68)

COMPLETED planes now roll out of the factory doors into an unusual wooden hangar which was recently constructed near the main assembly plant of the Fairchild Aircraft Division of Fairchild Engine & Airplane Corp., Hagerstown, Md. Believed to be one of the largest of its kind in the country, this hangar is built of laminated yellow-pine arches, measuring 170 feet across and 120 feet long, and required practically no critical materials.

Every convenience compatible with wartime economy has been incorporated into this structure. With a capacity of thirty-five Fairchild PT-19 trainers, provision has also been made for a flight test office, airplane and engine shop, parts stockroom, Army Air Forces inspection office, Air Transport Command dispatching office, pilots' lounges for both men and women, ready room, showers, and rest room. These quarters have been built into a two-story structure which forms the north side of the hangar. For servicing planes in the hangar proper, three parallel ducts carrying 110, 220-volt and hi-cycle current as well as compressed-air lines were built into the concrete floor. Steam heat is piped into the building from the main plant, and direct incandescent lighting is used for general illumination, with portable fluorescent fixtures available on the floor for detailed work on the planes.

### Design of Hangar

This Fairchild hangar of laminated-wood arches contains many innovations in construction and has the advantage, over the more commonly used truss type with columns, of requiring less material in the roof support and providing a greater span. The only truss necessary in its construction is built into the foremost bay.

Strips of 1 x 8-inch laminated yellow pine form the huge arches, the bottoms of which are joined by 1-inch rods. Each arch has 48 strips and was built up as a unit from the inside radius to the outside in large jigs. The strips are glued together, with no nails or other fastenings. Each arch consists of four sections, butt-joined and held in place by four metal splice plates 5/16 inch thick. The maximum height of the arches is 48 feet along the center line of the building. Before being raised into position, the two portions of each side of an arch were joined by splice plates, so that only one joint had to be made above ground, and then the arch sections were raised into position by a power winch on a truck

through suitable blocks and tackle. Two gin poles were used for erecting the arches, one on either side. The arches are spaced 10 feet apart and are covered with 2-inch tongue-and-groove lumber which in turn is surfaced with gravel-finished asphalted sheets.

Wood studs, 2 x 6 inches, form the framework for the side of the building and are covered with vapor-sealed insulation board. Asbestos sheets, 1/4 inch thick, butted along the vertical joints and lapped horizontally, form the outside surface of the sides.

Horizontal wind and racking loads are taken up by a large truss built into the foremost bay of the hangar. To the bottom of this truss at the front are attached the door guides. These doors, designed by Fairchild engineers, are each 17 x 27 feet and are made of a series of 3/4-inch x 5 3/8-inch vertical and horizontal members, covered with 3/8-inch plywood, glued and nailed to both sides of the frame. The doors operate on rollers over tracks embedded in the concrete floor and are manually opened and closed.



Laminated-wood arches replaced steel ribs in the construction of this 170-foot wide and 120-foot long hangar at the plant of Fairchild Aircraft at Hagerstown, Md.

When open, the eight doors are out of the way in pockets at either side of the front of the hangar.

A concrete apron, 170 x 130 feet, in front of the building is used both as a storage and service location. It has steel tie-down rings embedded in the concrete and also outlets for electric current.

### Personnel

This unusual wood structure was de-

signed for Fairchild by Albert Kahn, Associated Architects & Engineers, Inc., Detroit, Mich., and constructed by Norman S. Earley & Son, contractor, of Hagerstown, Md.

One of the most important factors in the care of equipment is proper lubrication. To keep your equipment working for the duration, select good lubricants and use them regularly.



### THIS OSGOOD "20" . . .

. . . is clawing a military road out of the stubborn, tangled New Guinea jungle. Other Osgoods are at work every day in every war theater—"dishing it out" and "taking it"—in rock, hard clay, mud, snow and sand. And no job is too tough!

All this world-wide, campaign-proved performance hastens the day when Osgood ruggedness, power, maneuverability (Osgood measured air control) and complete dependability can again go to work for you. With that in mind, why not check with Osgood now!



Keep your equipment rolling  
with preventive maintenance.



Keep the attack rolling  
with more War Bonds.



Front End Shovels  
For Industrial Tractors  
Write for Descriptive Circular  
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The  
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EXCAVATOR CO.

Sizes: 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100  
DIESEL - GAS - ELECTRIC

Associated with  
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HERCULES  
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6 to 12 Tons  
Diesel or Gasoline

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THE OSGOOD CO.



## County in Alabama Makes Culvert Pipe

(Continued from page 2)

gas tax. Each county in the state receives one-sixty-seventh of 3 cents of the 6-cent gas tax. The balance goes for the operation of the State Highway Department. Each county's share of the state gas tax for the fiscal year ending September 30, 1943, was approximately \$112,000. In addition to this, Dallas County levies a 2½-mill county-road and bridge tax which brings in about \$42,500 annually.

Dallas County floated several bond issues, known as County Road and Bridge bonds, 30 years ago. These were used to initiate the graveling of the county roads and for the construction of concrete and steel bridges. The 2½-mill tax was instituted several years ago to pay the interest and amortize these bonds so as to leave the income from the state gas tax intact for active highway work.

### County Roads

The area of Dallas County is 957 square miles, which is served by 691 miles of county roads and 138 miles of state highways. Of the county roads only 2.4 miles are paved and 500 miles have all-weather clay-gravel surfacing. The balance is graded but not surfaced.

These figures do not give an accurate picture of the county road situation, as 63 miles of county roads have been paved in the past seven years by the county and the state, matching Federal funds on a 50-50 basis, and these roads became a part of the state highway system. All but 8 miles of the state highways in the county are paved.

When Dallas County began to take its roads seriously, the right-of-way was from back-of-ditch to back-of-ditch by "custom and use." Now the right-of-way taken for primary county roads is 80 feet, for secondary roads 60 feet, and for trails 40 feet. A 24-foot roadway is standard with a 4 to 1 front slope and a V-ditch 1½ feet deep. This ditch is widened if the drainage area is large. All of the primary county roads are surfaced with a suitable pit-run clay-gravel.

### The County Pipe Plant

In order to provide an economical source of concrete pipe for culverts and to use its county highway employees most effectively, particularly in weather when road work is impossible, Dallas County purchased one form each for 12, 15, 18, and 24-inch tongue-and-groove pipe. A 40 x 80-foot building was constructed as a pipe plant, with one half for casting and the other half for curing.

The pipe crew of eight men makes a semi-dry mix of 1 : 2½ : 1½ ratio of cement, sand passing a No. 4 sieve, and coarse aggregate from ½ to ¾-inch screen size. This is mixed in a 3½-S Jaeger tilting trailer mixer that is used in the field at other times.

The Quinn steel forms are set up on the casting floor, filled with the semi-dry mix and carefully hand-tamped. The forms are stripped immediately and casting continued until there are ten pipe cast of each size. This is possible as the county has ten bases for each size. On the following morning the pipe is moved from the casting floor to the curing house, which is equipped with Binks atomizing fog nozzles. The pipe remains in this room for five days for wet curing and then is moved to the storage yard. It takes this length of time to fill the curing room so that the process of moving newly cast pipe in and cured pipe out is continuous during a period of manufacture.

The cost of manufacturing 24-inch unreinforced-concrete pipe in this small plant has been 48 cents per foot, with

an advantageous aggregate contract, the cost of other sizes being in proportion. This cost has recently risen to about 60 cents per foot because of the rise in the cost of aggregate and labor. The pipe crew usually makes forty joints of pipe in a forenoon, and this is considered a full day's work. The pipe has consistently tested 10 per cent above Class B plain-concrete pipe in strength.

### County Field Equipment

The county-wide construction unit is well-equipped for its work but has no extra construction equipment. The fleet consists of an Allis-Chalmers 65 tractor, two Caterpillar R5 tractors, a 5-yard Continental scraper, an Allis-Chalmers power-control 10-foot grader, a 10-foot Adams pulled grader, and no bulldozers. This outfit is used for grading and re-grading operations. It is supplemented when necessary by a ½-yard Northwest shovel, ten trucks, and a Caterpillar No. 112 power grader from resurfacing and maintenance operations.

The maintenance outfits which are

divided between the three maintenance districts include two No. 112 Caterpillar power graders in each, and a district crew of a foreman, eight men, and a truck. This outfit takes care of culvert pipe, cutting bushes, and other maintenance operations.

The success of the county highway department is attributed in large degree by the County Engineer to the three District Maintenance Foremen, the Bridge Foreman, the Shovel Foreman, the Construction Foreman, and the one Mechanic who looks after all the county equipment.

### Personnel

The Court of County Revenues of Dallas County is composed of Commissioners F. W. Moseley, R. M. Rountree, Sr., John H. Traylor, and Robert T. Jones, with Probate Judge G. Claiborne Blanton, ex-officio chairman. Lewis J. Moore, Jr., is County Engineer, and L. C. Mitchell, clerk.

Give War Bonds for Christmas!

### New Lubrication Bulletin

Graco lubricating equipment is described in a new catalog just released by the Gray Co., Inc., Minneapolis, Minn. While all the facilities of Graco are fully engaged in the war effort, many items of lubricating equipment have recently been made available for such civilian use as service stations, garages and fleet shops, and construction operations employing lubricating units in the field.

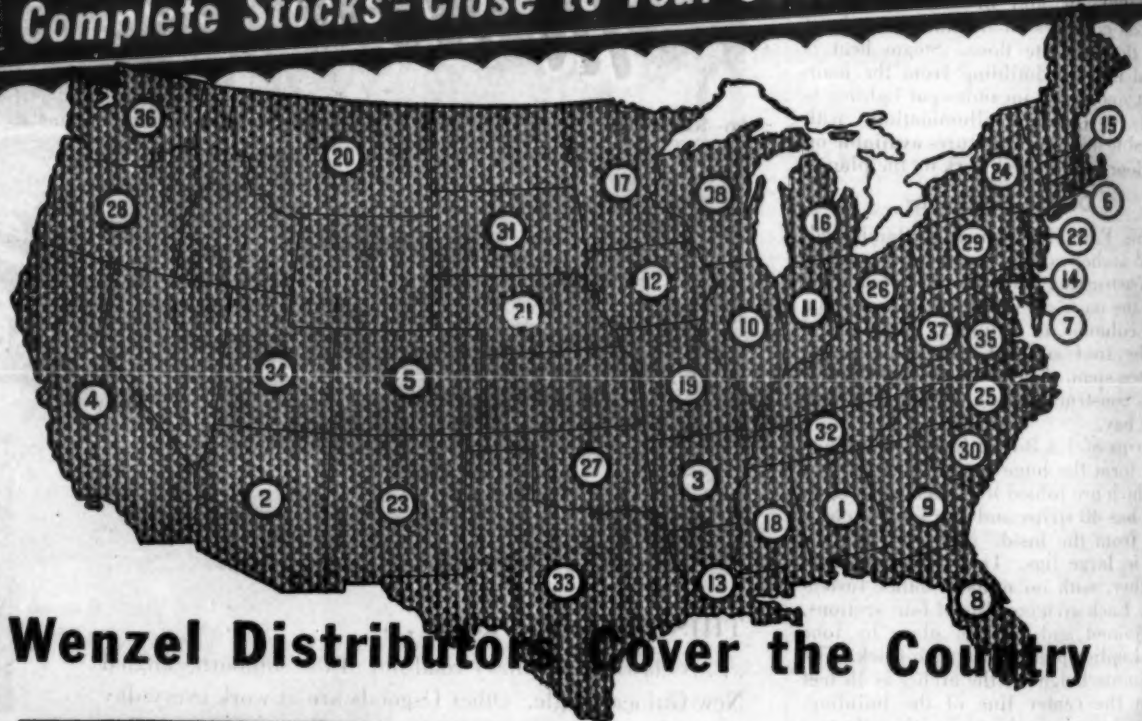
Copies of this catalog, P-934, will be sent upon request to the Gray Co., Inc., 60 Eleventh Ave., N.E., Minneapolis, Minn.

### New Davey Dealer

The Eighth Equipment Co., Rockford, Ill., has been appointed by the Davey Compressor Co., Kent, Ohio, as dealer for the Davey line of portable and industrial compressors, truck power take-offs, and pneumatic saws. Eighth Equipment Co. distributes in the western Illinois and Wisconsin territory.

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# H. WENZEL TENT & DUCK

ST. LOUIS, MO.



## Bridge Repair Truck Used by Dallas County

(Continued from page 2)

boxes set toward the front of the body with smaller boxes on top of these, acting as backs, so the men can sit on them when moving to and from a job. This part of the truck is also protected by a metal canopy. The tool boxes used as seats by the men carry jacks, flares, bolts, nuts, washers, and similar small equipment and materials. The two steel boxes which form the backs of the seats carry cross-cut saws, level rods, and other long light tools.

Beneath the steel bed of the truck and between the front and rear wheels are two additional steel boxes used for carrying picks, mattocks, shovels, and scoops. Also beneath the truck bed and running down the center is a box containing long tools such as post-hole diggers, crow bars, nail bars, pike poles, and here also are stored the wooden sides of the truck body which, when in place, convert it

into a 2 1/2-yard dump truck. For such service, of course, the tool boxes are temporarily removed.

At the rear of the steel bed a fifth-wheel plate is welded to the body for attaching the two-wheel trailer which is used to haul as much as 3,000 FBM of lumber at one time, or the pile driver. By omitting storage boxes for the rear 4 feet of the truck, sufficient room is provided for the trailer to swing when turning sharp corners or backing into position to deliver bridge timbers.

### Rerick of Etnyre Dies

Arthur C. Rerick, Vice President of E. D. Etnyre & Co. of Oregon, Ill., died recently at his home in South Bend, Ind. Known as the "Colonel", Mr. Rerick had been associated with Etnyre since 1932, working with dealer organizations throughout the country in the distribution of Etnyre equipment. At the time of his death, Mr. Rerick was on leave of absence, serving as a member of the Highway Machinery Division of WPB.

## Simplified Procedure For R/W Acquisition

(Continued from page 7)

cost for a good transportation service. Improperly planned and hindered by a multiplicity of legal, financial and administrative obstacles, a highway becomes a magnet for slum development, billboards, roadside stands of all sorts, decadent land values, and traffic congestion with its attendant human and economic toll; at the same time, it results in a high cost for a poor transportation service.

The problem is not so much one of devising an entirely new technique as it is of revising the existing mechanism and reassembling the parts to do a given job more effectively. There is no "best method" of right-of-way acquisition. Practice will vary with needs and circumstances. But if a land-acquisition policy is to be efficient in implementing the creation and modernization of our highway system, it must facilitate land assembly at the minimum total cost with the maximum of speed consistent with the preservation of the rights of private property.

### Recommendations

To this end the following recommendations are suggested:

1. A single efficient method, preferably what has been referred to as the administrative type, of acquiring lands for highway facilities or for all public purposes can effectively be substituted for the many cumbersome procedures now in use. There is nothing inherent in the nature of the units exercising the power of eminent domain or in the public uses for which lands are acquired that requires individual treatment.

2. To make possible the successful transformation of a projected public improvement into the finished product, it is suggested that the right of entry to make locations and surveys be written into the state statutes.

3. After certain preliminaries have been complied with, and pending the settlement of negotiations, the right of immediate entry and possession of lands is necessary to expedite the timely construction of highways and should be granted by law, with adequate safeguards for the protection of the property owner.

4. A centralized land-acquisition division should be created in every state highway department, equipped with adequate records and staffed with trained personnel selected by the merit system. A consistent policy should prevail, utilizing prenegotiation appraisals, options, standard values, research, summary court procedure, and all other techniques which experience has demonstrated result in greater returns per unit of expenditure.

5. The magnitude of the present expenditures and the time consumed in title searching and title examination in the transfer of property acquired for highway facilities (as well as for other public purposes) warrant a careful consideration of the merits of the effective and widespread adoption of the Torrens system of land registration in the various states. (Under this system, originated in 1857 by Sir Robert Torrens in South Australia, all deeds and documents affecting property are registered. A single certificate is issued indicating who the owner is and what encumbrances exist on a given piece of property, thus greatly diminishing the delays and expense of extensive title searches. Nineteen states have sanctioned the use of the Torrens system, but its use is largely permissive.)

6. Since the judicial condemnation mechanism used in most of the states today is cumbersome and costly, revision of forcible acquisition should be modeled after the summary and effective

administrative Court-of-Claims procedure utilized under the New York Grade Crossing Elimination Act. A single condemnation tribunal is most desirable.

7. Present land acquisition laws should be revised to the end that all court acquisition proceedings be given a genuine preference over all other civil actions in the setting of times for hearing and trial, so that all such actions may be heard and determined quickly. At the same time, means could be devised to make such a preference effective in practice.

8. In the interests of economy and dispatch, group condemnation should be sanctioned by law and used effectively in the acquisition of lands for highway facilities. Moreover, it is essential to the public interest that when the need arises, the condemnor of lands be permitted to abandon condemnation proceedings except when a property is deemed already to have been taken.

9. It is desirable to sanction friendly, non-contested, summary court proceedings in unusual cases and to cure defective titles to property which is acquired for public purposes.

10. All states should permit special benefits to property arising from public improvements to be offset at least against consequential damages. While some state statutes permit special benefits to be so offset, in actual practice it is rare that benefits of any kind are taken into account in the determination of just compensation. The sound public policy which is thus written into the law ought to be reflected in its application in practice.

11. Since the obvious financial incapacity of local units and of some states is becoming more and more of an obstacle in the provision of adequate highway facilities, the states and the Federal Government may find it necessary to finance acquisition of land for projects in which they participate.

12. The device of marginal land acquisition, popularly identified as "excess condemnation", should be legally sanctioned in all the states; it is used but sparingly in those jurisdictions in which it is permitted, despite its potential usefulness.

13. Where devices such as marginal land acquisition are not utilized, land use controls, i.e., zoning and platting and subdivision regulations, will be useful in producing a more efficient highway transportation system.

14. Despite the apparent usefulness of the limited-access highway, its potentialities are still largely unexplored. Early and wide-spread utilization of this type of motorway in areas of high traffic density will pay untold dividends in safer and more efficient travel.

### Coordinated Activity

Acquisition of rights-of-way should be closely coordinated with all other activities incidental to the construction of a highway. Improvements should be planned well in advance of actual need so that necessary steps incidental to construction can be undertaken efficiently.

Since right-of-way acquisition is no longer a simple task, needed land should be secured, or at least optioned, early in the preconstruction period. The right-of-way department must work in close harmony with the engineering, planning and roadside development departments at all times. Right-of-way, street and property lines must be determined, title searches made and title documents studied, appraisals made, right-of-way plats must be prepared from which right-of-way is staked in the field, negotiations entered into and purchases consummated, or condemnation proceedings instituted. Too often a highway facility is delayed for years because of inefficient timing or lack of coordination of right-of-way acquisition activities with other activities of a project.

From a Public Roads Administration pamphlet "Public Land Acquisition for Highway Purposes", copies of which may be secured from the Superintendent of Documents, Washington, D. C., for 16 cents a copy.

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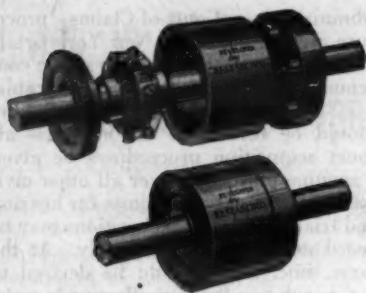
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The new Torkontrol clutch.

### Centrifugal Clutch Recently Developed

A new type of automatically engaging and self-disengaging centrifugal clutch which can serve either as a coupling between shafts or as a driving pulley or gear in a transmission, as well as a starting cushion between power units and driven mechanisms, has recently been developed and announced by the Amalgamated Engineering & Research Corp., 100 West Monroe St., Chicago 3, Ill. This unit, known as the Torkontrol, consists of a partially filled oil chamber fitted with a freely rotating hub which carries a series of movable wedge-shaped flyweights. As the hub revolves these weights fly outwardly and engage the internal rims of the outer case, binding the hub and shell into a functionally solid pulley or coupling.

This unit, the manufacturer reports, works equally well in either direction, and hence is reversible, and is set to engage or release at a given speed, and to slip in case of overload. The manufacturer claims that this unit permits the use of smaller engines or motors which start without load, gives smooth cushioned application of power, and straight-line acceleration with resulting saving in operating cost. These Torkontrol clutches have been built in all sizes from  $\frac{1}{4}$  hp to 500 hp for both built-in and general application.

Complete information may be secured direct from the manufacturer by mentioning this descriptive text.

### Proper Lubrication During Cold Weather

Lubrication is a most decided factor in keeping equipment working in cold weather. There is no more prevalent cause for interrupted operations than imperfect or insufficient lubrication. It is therefore necessary to plan in advance the selection of winter lubricants and a lubrication schedule for cold weather in order to avoid costly and unpatriotic breakdowns.

In a recent issue of *Lubrication*, published by The Texas Co., New York City, an article "When the Weather Controls Lubrication" contains a number of timely suggestions to insure winter work. It is pointed out that freeze-ups should not be construed to involve only ice and snow. Ordinary lubricants "freeze" also in that they congeal to virtual solidity when exposed to sufficiently low temperatures for comparatively long periods of time. Metals also "freeze", and become brittle and break more easily when subjected to impact or shock. In addition, "freeze-ups" due to water accumulation in lubricating systems can actually cause

lubrication to cease, presenting the added problem of wear and, subsequently, parts replacement.

All this applies primarily to machines working out-of-doors and subjected to temperature changes. The lubrication of such machinery must be approached according to the design of the parts, which means fundamentally bearings, gears, chains, wire rope, and the power plant. The loads imposed upon the moving parts become particularly severe when bulk materials which have become frozen or snowbound must be handled. Then, when lubricants are sluggish, it is of prime importance to watch for faulty lubrication, for costly wear, and increase in maintenance.

Wire rope is probably the most important single factor in material handling and its lubrication in cold weather must be carefully watched. The primary purpose of wire-rope lubrication is to prevent rusting of the wires and to retard wear by reducing internal friction as far as possible. Costly friction and wear are continually occurring between the wires

and strands of any wire rope unless it is properly lubricated. There is also a tendency to squeeze out any contained lubricant, especially when the ropes pass over sheaves or around drums. The renewal of lubricant is therefore an absolute necessity. The viscosity of a wire-rope lubricant should range from 400 to 1,200 seconds Saybolt at 210 degrees F, according to the operating temperatures involved. For continued cold-weather operation, it is generally advisable to use a lubricant of around 500-seconds viscosity to be assured of easy application and adequate ductility and resistance to chipping and cracking. In cold weather, wire-rope lubricants can best be applied hot, to reduce the viscosity temporarily and facilitate handling. Penetration of lubricant to the core is the secret of proper wire-rope lubrication.

Because of the great importance of lubrication to a continued working schedule throughout the winter months, Texaco lubrication engineers will be glad to help in setting up a proper lubrication schedule to meet any cold-weather

problems. Just write to The Texas Co., 135 E. 42nd St., New York City, and mention this item.

### New Vice President, Manganese Steel Div.

American Manganese Steel Division of the American Brake Shoe Co., Chicago Heights, Ill., has announced the appointment of Joseph B. Terbell as First Vice President. Mr. Terbell, who has been connected with the company for fifteen years, is a graduate of Sheffield Scientific School, Yale University, 1928. Immediately thereafter he started serving an apprenticeship of two years at the Chicago Heights plant of American, then entered the Chicago sales office and sold manganese steel and Amsco alloy castings. Later he became Eastern Sales Manager in New York. In 1940 he was appointed a Vice President of the American Manganese Steel Division, and now has been designated as First Vice President of that American Brake Shoe Co. unit.

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In 1937, to be exact, the Austin-Western "99-M" Power Grader opened the eyes of highway officials and contractors with its ability to outperform ordinary Motor Graders.

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**Tomorrow** Tried and proven on the home front where features designed to insure long life and trouble-free service have had their acid test since Pearl Harbor... on war fronts throughout the world, where the ability to stand up and dish it out is all that counts... Austin-Western machines of tomorrow are taking shape.

Your post-war machine may, or may not, resemble the models of today. But it will embody all the performance features of yesterday that have amounted up to today's infinitely higher standards. It will be "Built to Outperform."

THE AUSTIN-WESTERN ROAD MACHINERY CO., AURORA, ILLINOIS, U. S. A.

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Removes grease and grime in 1/5 the time. Ideal for cleaning machinery, motors and tools. Patented safety device affords full protection. Write today.

BUY MORE WAR BONDS



# Construction Operations

## On 190-Foot Timber Bridge

### Major River Crossing on Alaska Highway Completed By Canadian Contractor Despite Storms and Flood

By R. P. AGNEW, Highway Engineer, and J. B. KIELY, Associate Highway Engineer, Public Roads Administration

(Photos on page 68)

THE first stream crossing of major size on the Alaska Highway north of its beginning at Dawson Creek, British Columbia, is at the Kiskatinaw River, at which point the highway alignment is on a 9-degree curve across the stream to avoid heavy excavation and then enters a canyon. To carry the road across this stream, a creosote-treated timber structure was decided upon, consisting of a main river deck truss span 190 feet in length, with a 114-foot deck truss span on each side of the main span. The approaches consist of two timber-trestle spans on the south end and three on the north end. Concrete piers support timber towers to carry the trusses and pedestals support the trestle spans, except at the ends of the bridge where pile bents were used. The structure was designed for H-15 loading, in accordance with the 1941 AASHO specifications. The trusses are of the Warren type with steel gusset plates. Steel to timber connections were made with 4-inch sheer plates and ring connectors, and wood to wood connections with 4-inch Teco split-ring connectors.

#### Survey

Staking out of the structure began on September 5, 1942. The terrain at this crossing is very rough and accurate chaining was difficult. After the various points were set along the alignment of the bridge, the length of the chord across the curve from bent No. 1 to bent No. 6 was calculated and also the angle between the chord and the tangent to the curve at the end of the chord. The distance along the chord and the ordinates at 90 degrees to the chord were calculated for points on the piers and the original points set were checked, using the chord as a base line. The distance along the bridge alignment from the south end to the north end of the bridge and back to the point of beginning along the chord was treated as a closed traverse. Adjustments were made to correct inaccuracies in the first measurements and the entire distance was rechecked as a check. All points were then referenced and levels were run to establish working bench marks wherever needed.

As the concrete piers were completed, steel plates were set on the surfaces and punch-marked for center lines, because the alternate thawing and freezing during the winter affected the reliability of reference points and bench marks set in the ground.

#### Contractor's Preliminary Work

The contract for the construction of the bridge and approximately 3 miles of road from the north end of the structure was awarded to Don Construction Ltd. of Toronto, Ont. The construction of a tote road to the bridge site began on August 1 and was completed on August 15.

On September 1 the contractor started erecting a cement shed and aggregate bins for the concrete, and cutting timber for a temporary bridge across the river. This preliminary work was completed by September 20.

Then log cribs for the bases to support the falsework for the 190-foot span were started. Large sandstone blocks which had fallen into the river from the ledge above were drilled and shot, and used to fill the log cribs. During the early part of October, the contractor's forces completed the excavation for the piers to carry the two main towers, raised the log cribs to the height of the abutments, prefabricated the forms for the tower piers, and erected a wash rack for cleaning the sand and stone for the aggregate.

#### Concreting

Shortly thereafter arrangements were made to haul sand and gravel from a screening plant at Peace River. Specifications called for Class B concrete with a maximum-size aggregate of 2½ inches. The coarse aggregate was furnished in



Public Roads Administration Photo

Erection of heavy timbers on the north pier of the Kiskatinaw River Bridge, showing the ring connectors.

two sizes, from 2½ inches to ¾ inch and from ¾ inch to ⅜ inch, which were

(Continued on page 42)



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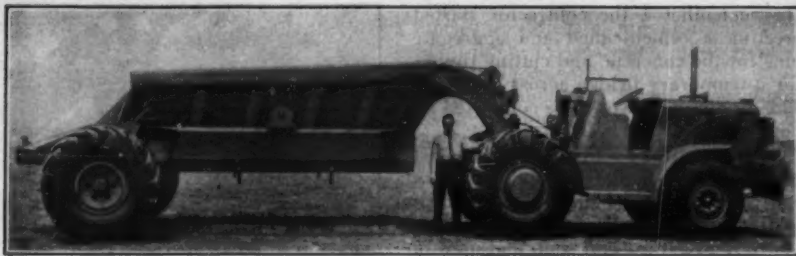
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Capable of handling 25-ton loads, this new 36-foot long Heil bottom-dump trailer wagon is being used to build military highways.

### Giant Dirt-Mover For Jungle Service

A feature of the new Heil bottom-dump trailer wagon, a fleet of which was recently shipped to Mexico for use in constructing her section of the Inter-American Highway through the jungles of southern Mexico, is its bottom-dump system. These new clamshell-type bottom-dump doors swing up alongside the hopper, so that when they are open the vehicle has more clearance than before it was dumped. They are operated by a power-driven cable, open in two seconds, close automatically by gravity, and lock when back in position.

This new dirt-moving wagon and its heavy-duty wheel tractor are 36 feet long, weigh 34,000 pounds, and are capable of hauling a load of 25 tons. Further information on this unit, which is especially designed for tough going, may be secured direct from the Heil Co., Milwaukee 7, Wis.

### A Wood Preservative That Can Be Painted

A simple wood preserving treatment that gives wood the lasting quality of heart pine and which can be applied without heat has been developed by The Pinola Co., Box 1262, Savannah, Ga. Pinola is a gum rosin base distilled with fatty oils which permits the rosin to penetrate into wood immersed in it, making the wood both moisture and termite-proof.

The lumber or timber to be treated is placed in a vat and covered with the Pinola for a period of 6 to 24 hours, depending on the cross-sectional dimensions of the wood. For best results, the timber being treated must be air-dried before the Pinola is used. However, green timber can be treated immediately after cutting by heating the Pinola in the vat to boiling, by means of steam pipes, with the wood immersed in the boiling preservative for a period of 6 hours. This drives out the sap and water which go to the bottom of the vat and may be drained out at a bottom pit cock. The timber is not removed from

the Pinola in the vat until the mass has cooled, requiring from 12 to 16 hours after the steam has been shut off. The penetration of the wood preserver takes place during the cooling.

Three coats of Pinola applied by hand brushing, each immediately following the previous coat, will moisture-proof lumber. All wood treated with Pinola may be painted with standard out-door paints after the treatment has dried, and there is no hazard to feet or hands of workers using this wood preserver.

Pinola is used by highway departments for treating bridge timbers and by other users of heavy timber for treating lighters, boats and building materials. It is sold by building supply dealers in Georgia, South Carolina, North Carolina, Virginia, Alabama, and Florida and any outside of this territory desiring information should write to the producer, mentioning this item.

### Post-War Planning For Use of Steel

The demand for fabricated structural steel for railroad and highway bridges, elevated structures, office and apartment buildings, schools and hospitals after the war will be very great, Dr. C. F. Goodrich, Chief Engineer of the American Bridge Co., told members of the American Institute of Steel Construction at its annual convention in October. He pointed out that during the war great strides have been made in prefabrication and believes that this art will undoubtedly

be extended after the war to peacetime uses.

Dr. Goodrich also reported a considerable amount of survey and planning going on right now for post-war construction, mentioning that the City of New York, Portland, Ore., and a number of other large cities have set up city planning commissions for the purpose of making such surveys and calling in engineering experts for consulting advice. Many of these are already at work on actual designing. The extension of highways, and especially of elevated structures in the larger cities, is being planned, and designs are being made for a number of long-span bridges.

"One of the casualties of the war," Dr. Goodrich said, "is that much of the necessary research and study connected with future peacetime requirements must remain at more or less of a standstill, due to lack of technical personnel and material. But it is necessary to examine some of these post-war problems now and endeavor to get their solution started as soon as possible."



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HERCULES SPLIT-SHAFT POWER TAKE-OFFS, inserted in the drive-shafts of these radically new fire-fighting units, transmit to the pumps the power of the truck motor. The result is a stream with three times the force ordinarily used, and the high-pressure fog thus distributed through the turret guns simply blasts away the flames and smoke.

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Hercules Power Take-off for  
Truck-mounted Equipment

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Road Serving a Developing  
Rural Area Near Pittsburgh

THE rehabilitation of Spring Run Road, a secondary road in Allegheny County, Pa., dates back to pre-war days when the project was started under the WPA. Work has progressed so that the old "red dog" road with an oiled dust-layer surface now has a slag waterbound-macadam base and a cold-mix surface providing an adequate traffic facility for an area of increasing importance in furnishing food for the Pittsburgh metropolitan district.

## Waterbound-Macadam Base

The 8-inch base of the new road was built up of two 4-inch layers of slag of a maximum screen size of 3 inches on an inverted choke of about 1 inch of slag dust of  $\frac{1}{8}$  inch and smaller, laid down by spreader boxes but not rolled. This layer was covered with a 4-inch layer of the No. 4 slag, 3-inch and smaller, keyed by rolling once with a 3-wheel 10-ton power roller followed by a 10-ton tandem. This prevented the slag breaking down under heavier rolling and keyed it sufficiently to make a substantial layer ready for choking with the slag dust, as in waterbound-macadam construction. On this the second 4-inch layer was spread by the same 10-foot Galion boxes working one ahead of the other to give the 20-foot width. This layer was rolled and then choked the same as the first to give the full 8-inch compacted base.

The preparation of the 8-inch base was started as a WPA project and, when that was discontinued, the work was taken over and completed by the County.

## Annual Bids on Materials

Allegheny County takes annual bids on construction and maintenance materials and services covering some fifty items so as to establish a price when those items are required in county work. Among these is an item for "furnishing, delivering and placing cold-mix bituminous binder, County Specification 'BM'". The price bid covers the cost per ton for this binder of the character and depth specified, complete in place on any bridge or road in Allegheny County, including compensation for all labor, materials, tools, forms and equipment required to prepare the base, and all work incidental to placing the material, as well as a tack coat on the old road metal.

The bidders are required to possess a plant capable of producing not less than 250 tons of acceptable finished material in an 8-hour day, based on a 2½-minute minimum mixing time per batch of 1½ tons in a twin pugmill. Further, the plant must have been producing this type of material for at least two years to be acceptable in the bidding. The minimum equipment for the plant also includes apparatus for drying, cooling, and storing the ingredients to permit continuous

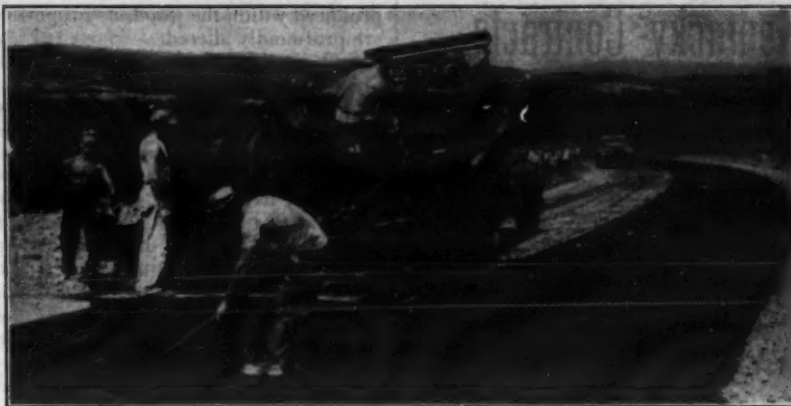
production at the minimum capacity specified.

The bituminous binder is a cold-mix asphaltic concrete made of a cut-back emulsified asphalt, a slag mineral aggregate, a slag dust filler and hydrated lime, proportioned by weight, except the lime which is measured by volume on the basis of volume-weight relation. The percentage batch weights are as follows:

	Min.	Max.
Mineral aggregate	82.0	89.0
Filler	5.0	10.0
Asphalt cement	3.0	5.0
Hydrated lime	0.5	1.0

\*The amount by weight of cut-back emulsified asphalt used must be such as to furnish an asphalt cement residue on the stone as required above.

The binder mixtures are required to be hauled to the work in tight vehicles cleaned of all foreign materials, and protected by a waterproof cover when conditions warrant. The hauling of the



C. & E. M. Photo

Salvaging a secondary road in Allegheny County, Penna., with a cold-mix binder course laid down by a Harber-Greene tamping-leveling-finisher.

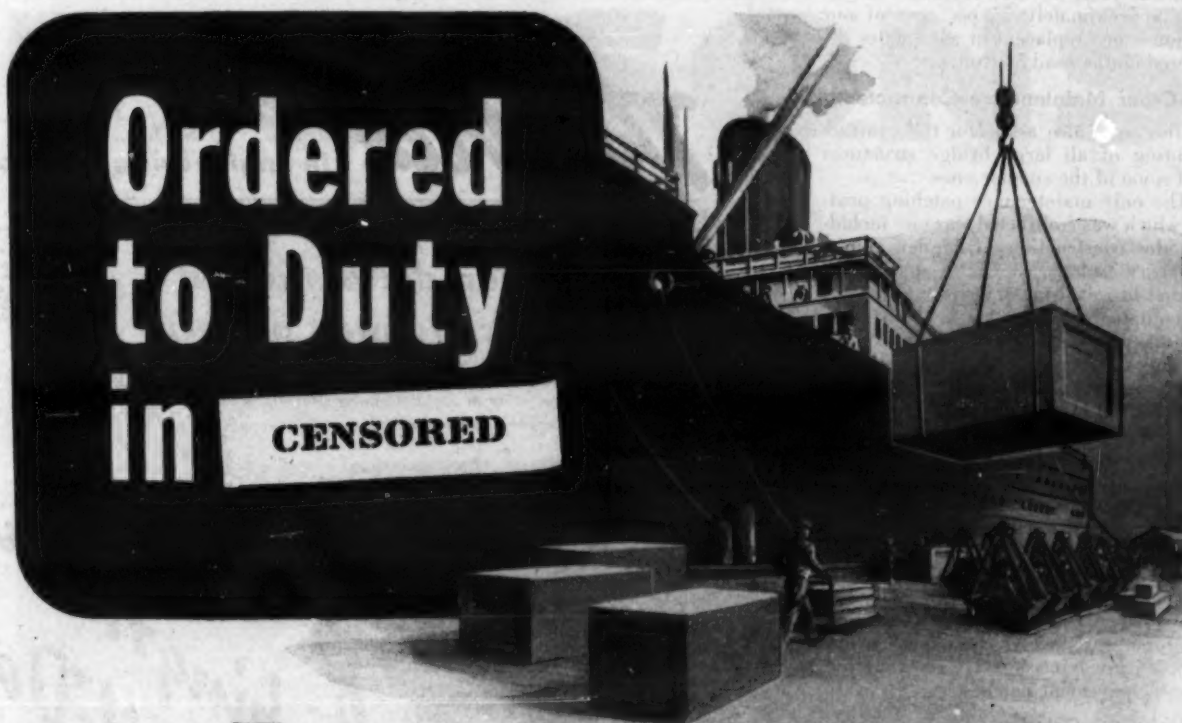
binder must be such that all deliveries may be placed and receive the initial compression in daylight.

## Laying the Binder Course

On the Spring Run Road work, as

specified for all work of this type, the slag waterbound-macadam base was swept thoroughly to clean off all loose material including excess binding dust in the choke. This was done by a De-

(Concluded on page 45)



Today's war is one of MEN, MACHINES and SPEED. Like lightning the Allies strike with a shock that reels back the enemy—certain evidence of the teamwork, planning and genius of our armies, engineers and construction battalions. Of the construction equipment speeding us on to victory all three

types made by Haiss are at the front. We feel a sense of pride and satisfaction in that Loaders, Conveyors and Buckets, too, are fighting equipment needed to win the war.

We can't discuss where or how our buckets and loaders are used; but wherever they are, you will know that a Haiss unit will give the service required of it... We and you both know that, because for more than 50 years the Haiss name has stood for satisfactory service.



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## Kentucky Contracts Speed Maintenance

(Continued from page 9)

thermore, we believe that the October 15 deadline for completing the work made possible satisfactory construction on all of these contract projects, as contrasted with our experience in some former years when not too satisfactory results were obtained on a few projects done in late October and November.

### Replacement Contracts

In advertising for replacement stone, gravel or slag to be placed on the state's approximately 3,300 miles of state-maintained gravel and traffic-bound macadam surfaces, alternate bids were asked for on the material to be delivered to the road by contract or to be delivered to and hauled by state equipment. In spite of the generally tight equipment situation this year, we were fortunate in getting approximately 75 per cent of our maintenance replacement aggregates delivered on the road by contract.

### Other Maintenance Contracts

Bids were also asked for the contract painting of all large bridge structures and some of the smaller ones.

The only maintenance patching project which was contracted was one including the construction of binder course and rock-asphalt patches of major size on an old rock-asphalt surface.

It might be added that last year bids were asked for the construction of a good many projects calling for scattered small concrete-pavement patches, but at that time no bids were received on some projects and on others, for which bids were received, the prices bid were considered excessive and consequently contracts were not awarded. However, since then, the Department's Construction Division has awarded contracts on some other concrete-pavement patching projects involving large yardages. Also the Maintenance Division may try again to get some satisfactory bids on certain projects involving small and scattered concrete-pavement patches.

### Conclusion

The Kentucky Department of Highways feels that it has gone as far with the contracting of maintenance work as seems necessary or advisable under the present circumstances, although it is possible that future developments may require further steps in that direction, in order to make the most effective use of the equipment and personnel of both the Department of Highways and of the contractors in the state.

## New Wood Treatment Has Post-War Values

An important development of the war period is the production of large composite beams, arches, boards, and the like from small, readily produced, easily dried sections of wood by gluing. It is no longer necessary to have a big tree to get big timbers, structural members, or even boards. Heretofore, it has been necessary to search long for 12 x 12-inch side-cut oak timber and then wait several years to condition it for use. Now small sections of oak may be cut and fabricated into 12 x 12's in a week or so.

New chemical treatments which virtually endow wood with the properties of a plastic and give it added strength, wearing qualities, hardness, and a resistance to warp and swell have been announced by the Ammonia Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. It has been found that if wood is impregnated with resin-forming chemicals capable of reacting with the wood cellulose and the resin then

produced within the wood, its properties are profoundly altered.

Soft maple thus treated has its compressive strength, hardness and resistance to moisture increased so that it may be substituted for steel in certain textile machinery parts where wood has hitherto been unusable.

Another treatment consists of impregnating wood by soaking green wood in a water solution of urea or by subjecting the wood to heat and pressure in the presence of urea. The urea-treated wood, when heated to temperatures near the boiling point of water, becomes plastic and is readily bent. On cooling, it regains its original rigidity and retains the shape given it while hot. On heating, however, it may again be softened.

## Link-Belt Co. Acquires New Minneapolis Plant

Announcement has been made by the Link-Belt Co., Chicago, Ill., of the purchase of the manufacturing plant and inventory of the Link Belt Supply Co. in Minneapolis, and of the appointment of

Ray S. Wood as Plant Manager. The Link Belt Supply Co. has worked very closely with the Link-Belt Co. since about 1900, and has served as an authorized distributor of Link-Belt products in Minneapolis, St. Paul, and adjacent territory.

The entire Minneapolis organization will be retained, and present manufacturing facilities will be improved to supplement and augment the facilities and services from the Link-Belt Co.'s plants.

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Variable Weights

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## The Week In Engineering and Construction

ENGINEERING NEWS-RECORD •

VOLUME 131 • NUMBER

### Three billion dollars asked for postwar highway projects

Hearings expected when Congress reconvenes on bill sponsored by the American Association of State Highway Officials. Money would be used for both urban and rural roads.

Appropriation of \$3,000,000,000 for postwar highway construction and "to provide for the immediate preparation of plans and acquisition of rights-of-way, to cushion the postwar conversion to peacetime economy, and for other purposes" is authorized by a bill on which hearings are expected to start soon after the Congress reconvenes. The bill, which supplements the Federal Highway Act, and has been referred to the Post Office and Post Roads Committee in the Senate and the Roads Committee in the House, was sponsored by the American Association of State Highway Officials.

It makes \$1,000,000,000 available for three successive years after the war, for the purpose of providing for the construction, reconstruction, and improvement of highways, and for the acquisition of rights-of-way, and for other purposes.

mileage, as is done in the new bill which increases the weight to 10,000 lbs. on population, area and mileage. The bill also provides for the construction, reconstruction, and improvement of highways, and for the acquisition of rights-of-way, and for other purposes.

*Looking Ahead to V-Day--*

War's end will set in action a nation-wide job of road construction and rehabilitation. Be ready—be competitively equipped—to get your full share of the work.

Time and cost-saving machines will enable you to handle more jobs with more profit. ... Write today for complete information on Cleaver-Brooks Tank Car Heaters and Bituminous Boosters. Get the complete facts on their high speed low cost performance—

heating road oils and bituminous materials to application temperatures. Learn why the original and exclusive Cleaver-Brooks four pass down-draft flue travel and integral burner construction, plus the positive dry-coil method of condensate return, provides unsurpassed speed and economy. Cleaver-Brooks Tank Car Heaters are built in two and three tank car sizes—Portable Pumping Boosters in two capacity sizes, with truck mounting or 4-wheel trailer. Send for bulletins or see your Cleaver-Brooks distributor.

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# Cleaver-Brooks

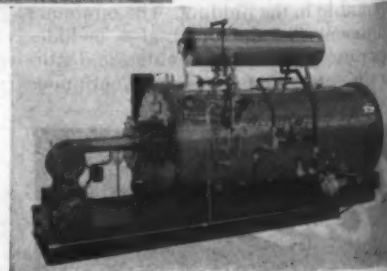
TANK CAR HEATERS . . . BITUMINOUS BOOSTERS . . . AUTOMATIC STEAM PLANTS



Cleaver-Brooks Portable Tank Car Heater—a high pressure, oil-fired, compact mobile heater, available in two and three tank car sizes.

Truck-mounted Cleaver-Brooks Portable Pumping Booster used in airport, flight strip, and road construction.

Cleaver-Brooks oil-fired automatic steam plants—available in 8 capacity sizes up to 100 H.P., working pressures to 200 lbs. Requires only simple field connections to place in operation.







Official U. S. Signal Corps Photo  
Hauling sand for fill at an airfield in the Aleutians.

## Engineer Activities In Aleutian Islands

A first-hand report of the activities of Corps of Engineer troops was given recently by Major-General Thomas M. Robins, Chief of the Construction Division, Corps of Engineers, after an inspection of work in the great triangle from Edmonton, Canada, to Attu Island to the Arctic Circle in Canada.

Pointing out the extent of and unfavorable weather conditions in the Aleutians, Major-General Robins outlined the kind of work being done by the Engineer troops, from permanent bomb-proofs to housing of all kinds, airfields, wharves, breakwaters, and roads through plenty of muskeg.

On one of the Aleutians, the troops landed on the beach and have built three wharves, 50 miles of main road to take care of the dispersal of installations, and an unusual airfield. For the latter there were two possible sites, one on high ground which would have required a large amount of grading, and a second on flat ground beside a creek. It was decided that if the creek could be diverted and a tidegate and pumping system installed, the airfield could be completed very quickly. In three days the flat was drained, the landing mats down, and planes could use the field. The sand all around the steel runways is kept hard, like the sand on a beach, by regulating the water table with the pumps.

At another island, with more muskeg than anything else, an airfield was also constructed in short order. Two wharves and a breakwater have also been built, the latter by contract under Engineer Corps supervision. The breakwater involved half a million yards of rock, and the contractor did the job with heavy equipment in three months.

## Equipment Cleaning Means Longer Service

Equipment cleaning is a part of any thorough preventive-maintenance program, not only because the elimination of dirt and grease from parts extends their life but also because such cleaning is essential for a thorough inspection and check for wear or damage, which often are concealed beneath a layer of dirt. A saving in maintenance time and

Iowa, manufacturer of the Siebring steam cleaner for maintenance and repair shops.

This cleaner is of sound sturdy construction, operates on natural or artificial gas or oil, is completely automatic and equipped with safety devices, and is wheel-mounted for easy portability about the shop. The manufacturer reports that this piece of equipment generates live steam in 10 minutes, and the use of a specially prepared chemical in the water aids materially in dissolving hardened grease, dirt and other foreign matter in a short space of time.

Further information may be secured by state and county highway engineers and by contractors direct from the Siebring Mfg. Co. by mentioning this magazine.

## Ice-Hazard Control For Airport Runways

Safe braking of an airplane on an icy or snowy runway is dependent on the same ample coefficient of friction be-

tween the wheels and the runway surface as is needed by a car on a highway in winter. Pilots often have difficulty in winter in braking their ships in time to avoid hitting parked planes on aprons or near hangars because of icy conditions.

A new information bulletin, issued by the Calcium Chloride Association, points out that abrasives alone are of little value on runways because the propeller wash blows the sand or cinders away, and outlines methods on the treatment of abrasives with calcium chloride and the use of calcium chloride alone, in dealing with this airport winter hazard.

Copies of this sheet, Brief No. I-52, may be secured by airport managers, county engineers responsible for the maintenance of county airports, and Army and Navy public-works officers at airfields and air bases by writing direct to the Calcium Chloride Assn., 4145 Penobscot Bldg., Detroit 26, Mich., and mentioning CONTRACTORS AND ENGINEERS MONTHLY.

# PARSONS



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## Post-War Planning For Georgia Roads

### Careful Study Under Way To Evaluate Earlier Work And Coordinate with New Conditions Caused by War

† A VERY definite concerted program has been instituted in Georgia to be certain that all specific post-war projects will fit into a well-conceived plan in which every part has been carefully analyzed from the standpoint of past knowledge and current trends. Under the direction of G. T. McDonald, State Highway Engineer, the work is being coordinated by R. A. Flynt, State Director, Division of Planning, with the collaboration of W. M. Danielson, Highway Engineer, Public Roads Administration, and the full cooperation of all department heads.

#### The Planning Approach

The initial step in the work of the Planning Division has been to prepare a large-scale map of Georgia on which is carefully and distinctly recorded the strategic network, the Federal numbered routes, the regular Federal-Aid routes, and other special classifications of routes. This map also shows the still-unpaved sections of these various classifications of roads.

A companion traffic map is in preparation, with the traffic recorded, as is customary, by the width of the highway for the major links of inter-state and intra-state routes to show where traffic travels.

Based on these two maps, a study is being instituted in the field and from office records to determine, first for the major routes, those which are adequate for the traffic they are called upon to carry, or will be called upon to carry with a reasonable readjustment in post-war traffic. Those which are obviously of sufficient width and proper alignment for the volume and speed of traffic to be carried after the war will be laid aside, as far as plans for post-war construction are concerned. Other routes, not so fortunate as to capacity with proper safety, will be studied carefully to determine the type of work that is needed. When the time for detailed planning arrives, the work will be done first on those routes which will be the most heavily traveled, and are found to be most inadequate.

The Division Engineers of the State Highway Department are being asked to decide, as of the present, what is the need of each route to make it adequate as to surface, bridges, etc., all on the present location and grades, that is, without disturbing the system by relocation or heavy changes in grade. The work determined by this survey will be that which has been made necessary by war use and the lack of adequate and proper maintenance. The present contract lettings through the Maintenance Department for resurfacing a large mileage of Georgia highways is a part of this program.

At the same time that the surveys are going on for the work to be done in the immediate future to salvage the present road surfaces, future work will be set up on a system of priorities based on the traffic and other surveys and analyses. This will be done first on the systems of major importance, which will stimulate planning thought within the departments on needed changes in alignment and grade and whether traffic at present or in prospect will require a 2, 3 or 4-lane highway. At present Georgia feels that the state has established no adequate criteria for this and that it is necessary to set up such standards so that there will not be a general cry for

multiple-lane highways for merely decorative or publicity purposes. The roads must be built for the traffic that must be served.

#### Spreading the Work

This approach will be followed through the entire state-aid system, with the Division Engineers cooperating with the General Offices and the Planning Division. Along with this, it is the desire of the present highway administration to develop and construct a system of farm-to-market roads which will be the particular interest of the farmers and the post-road users.

The natural course of this will be through the further development of the county road maps to indicate the results of traffic surveys, showing the use of the various county roads by different types of traffic. This will serve to encourage county officials to initiate a system of priority construction by the counties based on their traffic needs.

The "post-roads" are not on the state-aid system but are feeders to that system

or farm-to-market roads and are included in the county systems. Such information as the State Highway Offices can furnish to the county highway departments to aid them in developing their priority of construction will also aid in the promotion of the idea that there should be a large post-war state-wide construction program on the state highway system to cushion the unemployment that is bound to occur in a

state like Georgia which has stepped ahead fifty years industrially during war because of the ship-building plants, the chemical industries, and the munitions and aircraft plants that have been constructed and brought great additions to her population. These added workers must be taken care of or there will be a great loss in population and overall wealth in the state. The program

(Concluded on page 48)

Open Highways are IMPORTANT  
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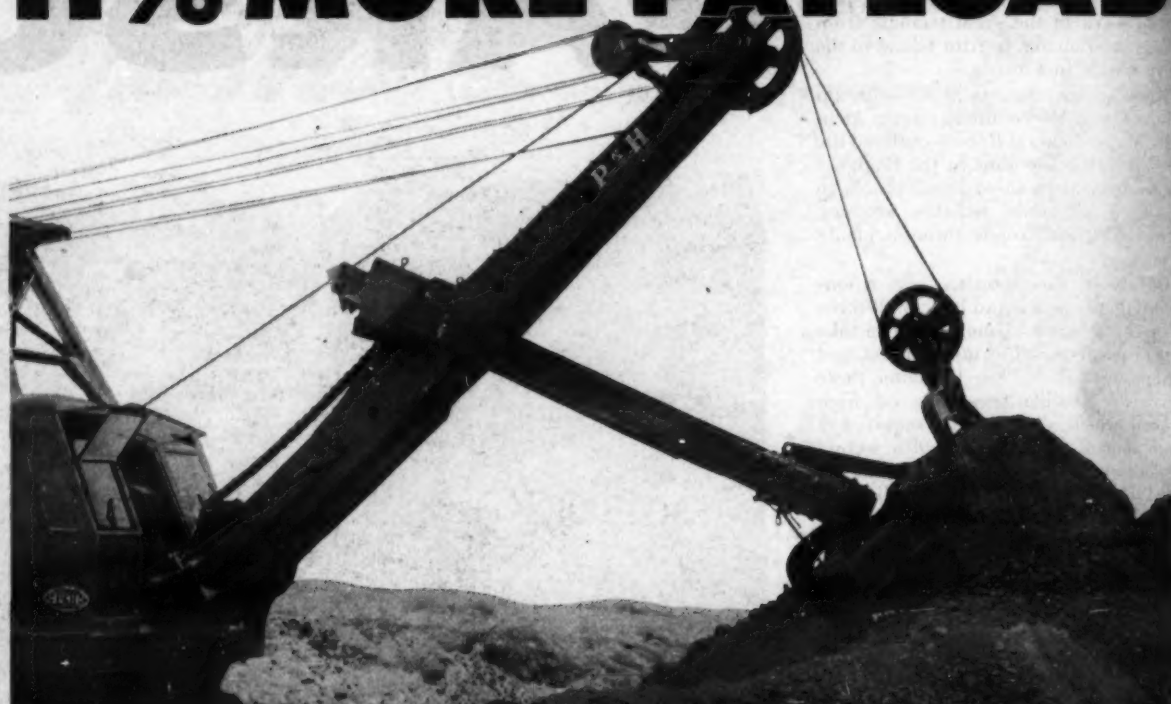


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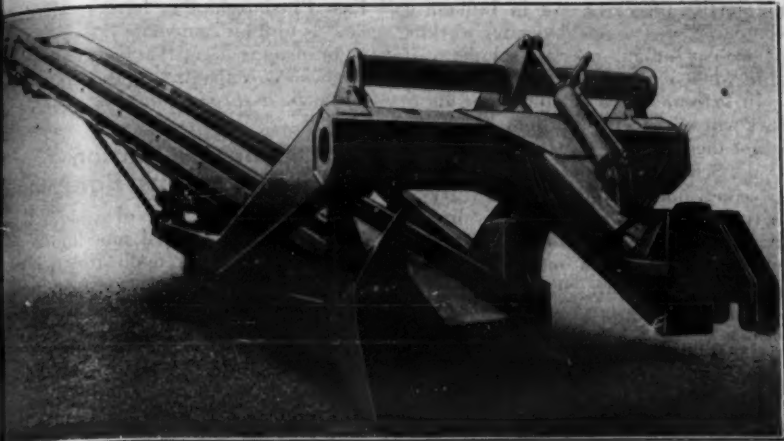
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A new earth-loading unit recently announced by Euclid.

### Tractor-Drawn Loader For Dirt-Moving Jobs

A new versatile loading tool for many types of earth-moving jobs such as airports, Flight Strips, dams, highways, plant sites and soil stripping has recently been announced by the Euclid Road Machinery Co., Cleveland, Ohio, for use with large-capacity hauling equipment. This Euclid Loader will handle practically any material, from loose sand to hard clay and shale, and is designed to work with large hauling units for continuous production.

A wide cutting blade and plow point, with a maximum cutting width of 9 feet 6 1/2 inches and a maximum cutting depth of 24 inches, send a steady flow of earth to the 54-inch belt conveyor which has a capacity of one ton a second. This conveyor, which is powered by a Cummins 150-hp Model HBI-600 diesel engine, is mounted on a pivot connection near the tail pulley and on parallel struts near the head pulley. It may be shifted from its operating position to one parallel to and within the frame sides for shipping. The frame of the loader is of welded steel box construction, with a hexagon torque tube at the front, and a rectangular torque tube at intermediate points and the rear. The design of the welded heavy-steel box drawbar and universal hitch and yoke centers the drawbar weight on the puller tractor and permits sharp right-angle turns for work in narrow cuts. Rear support on the crawler tracks and the universal hitch make cocking of the unit easy and accurate.

Three hydraulic control levers mounted within convenient reach of the tractor operator eliminate the need for a second operator on the loader. The manufacturer states that the tractor operator can coordinate loader and tractor movement and has instant control of the conveyor belt, angle of the cutting blade, and the depth of cut. The blade and wheel hoists are interchangeable and are of the heavy-duty Euclid single-stage type. The clutch control hoist is of the Euclid continuous-flow single-stage design, with a packing-less piston. The speed of the engine is controlled by a clutch hoist to reduce engine speed when the belt is stopped and open the throttle when the belt is started.

The overall length of this new Euclid Loader, including hitch, is 46 feet, its overall width in operating position, 17 feet 6 inches, and its overall height, 14 feet. The clearance under the chute is 10 feet 3 inches, the conveyor is 32 feet

long, and the belt length, 67 feet 8 inches.

A 4-page folder describing and illustrating this new Model BV Euclid Loader may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

### New Booklet on Wood As Engineering Material

The interest in wood as an engineering material has, of necessity, greatly increased in the face of wartime shortages of steel, and many interesting structures have been built of wood during the war construction program. Because of this, a new pamphlet "Wood as an Engineering Material", recently published by the American Society for Testing Materials, is of particular interest to contractors and engineers.

This pamphlet is a reprint of the Edgar Marburg Lecture presented before the Forty-Sixth Annual Meeting of the Society by L. J. Markwardt, in charge of the Division of Timber Mechanics of the U. S. Forest Products Laboratory at Madison, Wis., which is now carrying on extensive research in war problems. The paper is a comprehensive discussion of wood, its formation, various kinds, physical structure, moisture content, chemical seasoning, properties, strength, structural grading of timber, working stresses,

modern connectors, composite construction, glues, treatment for protection from decay and from insects and borers, and the many structural uses of timber.

Copies may be secured by those interested direct from the American Society for Testing Materials, 260 So. Broad St., Philadelphia 2, Penna. Price: \$1.00 a copy.

### Underwater Cutting Torch

The new improved model of the Victor underwater cutting torch is very completely described and illustrated in a bulletin just released by the Victor Equipment Co. In addition to the detailed description of the torch, actual underwater photographs are included, showing the torch at work. The bulletin also carries a replacement parts list on the back page.

The Victor Equipment Co., 844 Folsom St., San Francisco, Calif., will send copies of this bulletin on the Model 3900 underwater cutting torch upon request and mention of this publication.

**B**ECAUSE he was properly geared-up in times of peace, your Cletrac distributor and members of his shop and field forces are making an important contribution to the war effort. More than ever, he is placing service ahead of sales—and is ready to assist you keep your Cletrac equipment "Fit to Fight."

He stands ready to help you get the greatest possible use from your equipment.



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You'll find, too, that he carries as great a stock of parts as war conditions permit. War or peace, your Cletrac distributor is a good man to know.

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Up To 200 Ton Capacity.*

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LA CROSSE, WISCONSIN U. S. A.



## Licking Snow and Ice On Indiana Highways

(Continued from page 1)

but the actual operations and responsibility for economical accomplishment is placed in the thirty-six Sub-Districts, each under a Sub-District Superintendent.

### Snow Removal

Instructions to the Sub-Districts are that when the surface of the road is covered and the weather report is "continued snow", the Sub-Districts send out their fast one-way plows mounted on 1½ and 2-ton trucks. Each patrolman has a one-way plow as part of his winter maintenance equipment.

Each Sub-District garage has heavier equipment, such as 3-ton all-wheel-drive or rear-wheel-drive trucks with V-plows or heavy one-way plows. The V-plows predominate in this type of equipment. A number of the heavier trucks are equipped with underbody scrapers, which are used back of the V-plows in one operation to clean the remaining snow from the road. Mr. Schafer feels that a much larger number of this type of equipment could be used to advantage.

The rule is to plow back to the ditch line in the northern part of the state and somewhat less in the southern part. This leaves plenty of room for later plowings which, of course, vary locally and from year to year. Where there is chronic drifting, necessitating extra work, the Sub-District Superintendent assigns a spare 3-ton truck to that patrolman for the winter.

Indiana relies entirely on mechanical blading for the removal of snow. No chemical of any kind is used in snow removal, although some is used in ice control.

The usual sequence of operations on a highway in winter is to go out and plow the snow or slush ice off the road first, then if a drop in temperature is expected, so that ice may form, the curves and hills are sanded immediately, followed, in the north, by a sanding of the straightaways if necessary.

### Ice Control

Either sand or cinders, whichever is available locally at a better price, is used for an abrasive on icy roads. The

material is stockpiled on the right-of-way close to the points where it will be needed. This is done during the autumn whenever trucks are going out on routine trips and have no other loads to take out. Calcium chloride is placed on the top of the pile and allowed to leach down through the pile to prevent freezing. More of the chloride is added during hand loading if it is needed, but very little has been found necessary.

The sand or cinders are spread on the road by a Butler sand spreader. This is a simple rotary spinner which was invented by an Indiana patrolman. A hand crank is used to operate the spinner and the agitator to prevent clogging of the material in the throat. The rate of application is left to each crew, which decides whether the conditions warrant using more abrasive or less. They are instructed to use the least material possible to secure a safe traffic coverage.

Some experimenting with sawtooth blades for scarifying ice has been carried on, but Mr. Schafer feels that while they work well on compacted snow, they do

not justify the extra cost in Indiana as compared to straight blades for working on ice, so Indiana uses any blade available when ice removal is necessary.

In extreme cases calcium chloride or rock salt is used raw on the ice, but this is not the standard practice.

Mr. Schafer pointed out that snow and ice conditions in Indiana, while trying at times, are nowhere nearly as bad as those experienced in Indiana's northern neighbors, Michigan and Minnesota, where a much more extensive organization is necessary to combat winter hazards.

### Army-Navy "E" Awards

The following companies have received the Army-Navy "E" Award for excellence in production: Davey Compressor Co., Kent, Ohio; Thomas Laughlin Co., Portland, Maine, manufacturer of wire rope and chain fittings; and Raybestos Division, Raybestos-Manhattan, Inc., Bridgeport, Conn. Nine plants of the Westinghouse Electric & Mfg. Co.,

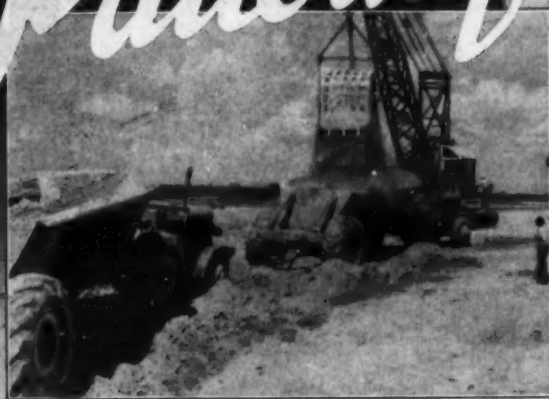
East Pittsburgh, Pa., have received renewals of their Army-Navy "E" Award. Eight of these plants having their second renewal and the ninth, the fourth renewal of its production award.

### New General Catalog On Bituminous Equipment

The American line of road-maintenance, contractors' and pipe-line equipment is described and illustrated in the General Catalog No. 100 issued by the American Steel Works. The units covered by this catalog include asphalt and pitch heating equipment, tool and surface heaters, bituminous distributors, trailer spray units, tool boxes, salamanders and water heaters, oil burners, torches, asphalt-paving and pipe-coating tools, and sheepfoot rollers.

Copies of Catalog No. 100 may be secured by interested contractors and state and county highway engineers by writing direct to the company at 27th & Southwest Blvd., Kansas City, Mo. Please mention this item.

# Pattern for Victory



Rear-Dump and Bottom-Dump EUCLIDS are meeting up with many old friends these days—Army and Navy men who know from their peace-time construction experience that EUCLIDS can be depended upon to get jobs done even when the going is too tough for ordinary hauling equipment.

On off-shore bases in all parts of the world, as well as here at home, EUCLIDS are hauling earth, rock and other materials for the construction of air bases and military installations that are important parts of our pattern for victory. See your nearest Euclid Distributor for facts and figures.

**The EUCLID ROAD MACHINERY Co. . . . Cleveland, Ohio**

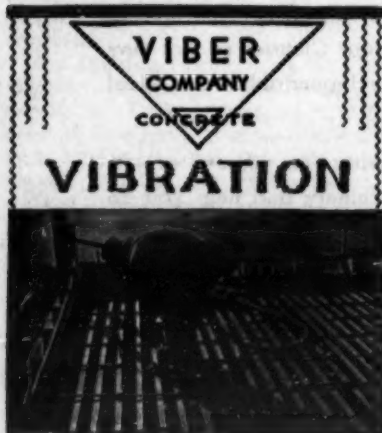
For obvious reasons, photographs of EUCLIDS at work on confidential military installations cannot be shown here; these views are typical of the jobs that EUCLIDS are doing for our armed forces at home and abroad.



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HAULING EQUIPMENT**  
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CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS



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REINFORCED CONCRETE  
BUILDING CONSTRUCTION**

When the job calls for mass vibration—the Viber Vibrator at work above is your best bet. Especially made for walls over 10 inches thick, foundations, large girders, thick floor slabs, columns . . . large reinforced concrete bridges, grade separations, concrete floor systems, concrete arches and rigid frame structures . . . in a word, for all concrete with large aggregate and low water-cement ratio.

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**VIBER COMPANY**  
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The second oil pipe line to the east coast, paralleling Big Inch, being welded by Hobart arc welders.

### Another Pipe Line To East Being Built

The Big Inch oil pipe line from the southwest to the east will soon have a "Big Brother" to aid in its delivery of gas and oil to the Atlantic seaboard. The new pipe line, work on which is already under way, is being constructed within a few feet of Big Inch and will almost double the amount of petroleum products to be delivered in this fashion to the eastern area.

It is expected that this new 20-inch line will be constructed in much less time than the original line, as much of the clearing and grading work will not have to be repeated. Also, the lessons learned in the construction of Big Inch will aid in the work on the new line. For example, heavier steels will be used under all large rivers as a safeguard against wash-outs during high waters. Like Big Inch, the new line will consist of seamless steel pipe, arc welded in place.

### Photo-Reproduction Prevents Mistakes

Any engineering organization or contractor frequently needs extra copies of letters, papers, financial data, blueprints, tracings, and sketches very quickly. The Apeco method of photo-copying direct from anything written, typed, printed, pictured, or drawn saves extra typing, proofreading and tracing.

This compact device, made by American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill., copies mate-

it legally acceptable. The paper used for reproduction gives color and shade gradations in distinguishing shades of black and grey.

The Apeco photo-copy unit weighs only 10 pounds, measures 12 x 12 x 24 inches, and operates on either alternating or direct current. Complete information will be found in descriptive literature which may be secured direct from the manufacturer, Department 229, by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

### Total Road Mileage In the United States

The latest summary report of the U. S. Public Roads Administration on the total mileage of state-controlled rural highways, county and local rural roads, and city streets is presented here, as it gives a picture of the tremendous job of rehabilitation ahead of our various state and local highway and street departments to overcome the deterioration caused by deferred maintenance due to

lack of man-power and materials, and the overloading of the comparatively few hauling trucks available.

The total mileage of rural roads under state control is 528,160, county and local rural roads total 2,405,834 miles and street mileage, including trans-city connections with rural roads, is 303,891, making a grand total of 3,237,885 miles of highways, rural roads and city streets within the borders of continental United States, excluding Alaska.

The mileage of surfaced highways, which have carried the greatest burden of traffic, totals 1,583,734, of which 429,535 miles are rural roads under state control, 931,389 miles are county and local rural roads, and 22,180 miles are city streets.

The American Road Builders' Association has issued the fourth printing of "A Sound Plan for Postwar Roads and Jobs". Copies may be secured by those interested by writing direct to the A.R.B.A. at 1319 F Street, N.W., Washington 4, D. C.



Ten feet of snow blanketed the typical highway cut shown above, before a 250 H.P. Walter Snow Fighter arrived and blasted through in short order.

### MARVEL-KOTE MEMBRANE CURING COMPOUND FOR ALL CONCRETE SURFACES

Meets Federal and State Specifications  
ALSO

ASPHALT ROOF COATINGS  
ROOF AND METAL PAINTS  
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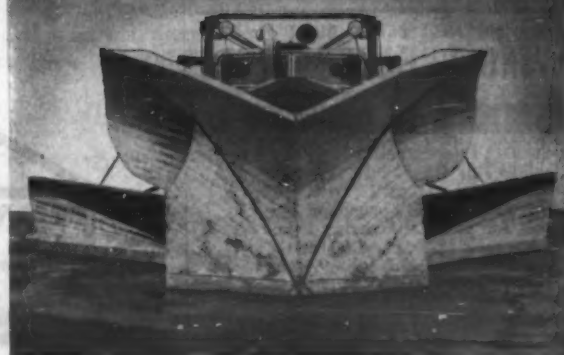
• Tremendous power—plus the ability to turn that power into smooth, positive traction—is the combination that enables Walter Snow Fighters to "gobble up" the toughest highway snow removal jobs.

Through the unique action of Walter Four-Point Positive Drive, the full rated horsepower of the motor is delivered to each of FOUR driving wheels . . . according to its traction at any instant. There is no slipping, stalling or "wheel spinning"—just a steady, powerful "driving-ahead" that smashes mammoth drifts and runs the Walter Snow Fighters at relatively high speeds through level stretches of deep snow. At such speeds, the snow is hurled to the side—not merely "turned over" as is the case with slower, conventional trucks.

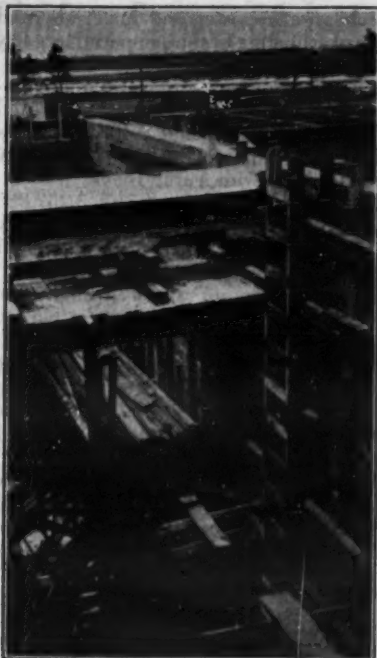
For the complete story on Walter Four-Point Positive Drive and many other specialized mechanical features of Walter Snow Fighters, write for detailed literature or consult your nearest Walter distributor.

**WALTER MOTOR TRUCK COMPANY**  
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### WALTER SNOW FIGHTERS







C. &amp; E. M. Photo

The falsework and framing to support a tie beam was built up from the hopper bottom of this Imhoff tank at a southeastern Army airfield.

## Concrete Tanks For Sewage Plant

**Increase in Personnel at Southern Airfield Required Addition of Three Imhoff Tanks; Forms, Baffles**

BY converting the original trunk sewer at a southeastern Army airfield to a pressure line, its capacity was sufficiently increased to care for the additional personnel ordered to the field for training. The original group of four settling tanks with two separate sludge-digestion tanks was not sufficient, however, to carry the extra load, so three pairs of Imhoff tanks, 48 x 49 feet with a 25-foot depth to the flow line, were built of concrete to meet the need for additional capacity.

To economize in construction cost and speed the completion of this additional facility, the concrete baffles which make a 2-story Imhoff tank out of an ordinary deep hopper-bottom tank were omitted. This also saved time in the preparation of the elaborate form work required. In place of the concrete baffles, cypress wood baffles covered with Transite sheets were used.

### Form Work

The forms for the pairs of Imhoff tanks were all built at the site by a crew of thirteen carpenters. The tanks were rectangular and did not present many difficulties in form work except for the cross beams at the top, the forms for which had to be carefully supported from the bottom of the tanks. The inside and outside forms for the outside 10-inch walls were of tongue-and-groove lumber 1 x 6 and 1 x 8-inch with 2 x 4-inch studs 18 inches on centers. Eight wales of double 2 x 4's were used with

1/4-inch tie rods with outside clamps and Richmond Snap-Tys. For the 12-inch center wall between the two tanks, the forms were heavier because of the extra load of concrete. The form lumber and studs were the same but the wales were double 2 x 6's.

The design of the walls required several breaks in their continuity, which made for weakness in the forms. At these points the contractor used the same forms but doubled the number of ties.

The falsework for holding the beam forms was rather intricate to produce stability and prevent deflection of the forms during pouring. Columns of 4 x 4-inch timber were well braced on the hopper bottoms of the tanks and, with knee braces at the top, held double 3 x 12-inch sills. On these, 4 x 4-inch posts were placed with 4 x 4-inch caps for the 2 x 4-inch longitudinal stringers on which the 1 x 6-inch tongue-and-groove beam-bottom form lumber was laid. Random lengths of 3 x 12-inch lumber were laid across the sills to form a platform running the length of the

beam for use by the carpenters assembling the beam forms.

### Pouring the Concrete

All concrete for this work was delivered by 2-yard truck mixers and included an admixture of Pozzolite for workability. Concrete was purchased delivered, as the quantities for individual pours were so small that it was more economical to order the desired amount delivered than stockpile the small quantities of aggregates, with the usual losses. A single pour consisted of the four side walls and the center wall, amounting to 176 cubic yards, which was completed in 13 1/2 hours of continuous pouring, although about 1 1/2 hours were actually lost waiting for the delivery of concrete by the commercial plant. The pouring of the hopper bottom and footings for the walls amounted to 118 cubic yards.

A wooden tower for handling the concrete was erected alongside one pair of tanks and moved from one to the other as required for the pour. On it

an Insley side-dump bucket was raised at the proper elevation to receive concrete from the 1-yard elevator bucket which was raised by a double-drum National hoist powered by a gas engine. The concrete was vibrated in the forms by gas-engine-driven Mall and Barry Aurand electric vibrators, the latter being converted later for surface rubbing.

### Major Quantities

The major quantities involved in the pouring of the three Imhoff tanks were:

Excavation, structure	4,850 cu. yd.
Backfill, borrow	9,500 cu. yd.
Concrete	1,180 cu. yd.
Cement	1,770 bags
Reinforcing steel	131,000 lbs.
Gravel backfill against walls	30 cu. yd.

### Personnel

The contract for the construction of the additional Imhoff tanks at this southeastern airfield was awarded by the U. S. Engineer Department to Edward Moore & Sons, for which F. R. Rogers was Superintendent. Major Henry S. Brooks was Area Engineer for the U. S. Engineer Department.

## A New Home for Navy Blimps

Two Clyde Steel Stiff Leg Derricks, mounted on 145 foot traveling steel towers, place sectional units of pre-assembled timber arch trusses for Naval Air Station blimp hangar on Eastern Seaboard.

The 51 trusses have a span of 246 feet, a 170 foot rise and are spaced 20 feet on centers. The hangar will have a ground plan of 1,058 feet by 296.5 feet. As erection progresses, each tower and derrick moves along a pair of railroad tracks spaced 33 feet apart.

Booms of the Clyde derricks are 75 feet long with lifting capacities from 21 tons to 40 tons depending on the operating radius.

Clyde derricks are available in a complete range of sizes from one to 100 tons capacity and are built in guy and stiff leg types.

Clyde derricks are carefully engineered to give the maximum value, quality and performance.

### TAKE CARE OF WHAT YOU HAVE

- Periodic inspections
- Proper adjustments
- Necessary replacements
- Thorough lubrication

... will help keep your equipment in good working condition.

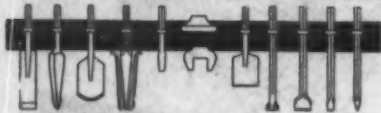
### BUYING WAR BONDS

will help protect your home and your country.



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## "BICKNELL BETTER BUILT" PAVING BREAKER TOOLS



We manufacture a complete line of tools for pneumatic paving breakers, rock drills and diggers.

Write for descriptive circular

**BICKNELL MANUFACTURING CO.**  
12 LIME STREET ROCKLAND, MAINE



## Filling Muck Holes For Florida Paving

(Continued from page 14)

over the end, compacted, and then the crane returned to work.

Approximately 50 per cent more sand went into the fill than the measured volume of muck removed. All fill above water was compacted by sheepfoot rollers pulled by a web-footed Caterpillar fifteen tractor. The original track plates were removed from the tractor and 2 x 6-inch timber bolted to the plates to extend the width of traction to about 2 feet. This tractor was used to pull out trucks when stuck on the job, pull the sheepfoot roller, and at times as a pusher for the scrapers. The fill was graded by a Caterpillar No. 12 power grader with tandem drive.

### Major Quantities

The major quantities involved in this contract, omitting the concrete paving items, were:

Clearing and grubbing	123.19	acres
Excavation, regular	139,168	cu. yds.
Special ditch excavation	3,735	cu. yds.
General excavation	84,513	cu. yds.
Gravel, cu.-cu. yds.	239,394	cu.-cu. yds.
Blanket, 6 inches thick	45,512	sq. yds.
on shoulders	167,000	sq. yds.
Gravel		

### Personnel

The contract for the grading and paving of 4.297 miles of Florida Road 21 northeast of DeLand as an access road was awarded to Ebersbach Construction Co. of Tampa, Fla., on its bid of \$357,851.02. D. H. Stoll was Superintendent for the contractor, and W. C. Drenning was Project Engineer for the State Road Department of Florida.

## A New Type of Tops For Drawing Boards

Blueprints made direct from pencil drawings usually lack sharp clear qualities and for that reason, drawings for blueprint reproduction are generally done in ink. A new type of drawing-board top which makes the pencil stroke clear, legible and sharp so that blueprints may be made directly from it is manufactured by the W. H. Long Co., 425 No. Clark St., Chicago, Ill.

The No-Ink drawing-board top is made of a specially processed white composition  $\frac{1}{8}$  inch thick and is permanently glued to any drawing board. Drafting tape is used in place of thumb tacks and a 3-H pencil is recommended. The No-Ink drawing surface is resilient, allowing the drawing paper to be slightly indented by the pressure of the pencil. All lines are drawn with a double stroke. The indentation made by the first stroke is filled solidly with lead by the back stroke, resulting in a solid clear-cut line giving a sharp legible reproduction, the manufacturer states.

The resiliency of the No-Ink top provides long service life, as indentations made by the pencil and holes from the compass close up and disappear. The cork-like surface is processed uniformly throughout, there is no grain in it, and it does not harden or turn color with age. The top is easily attached to any drawing

board, and makes it possible to put old battered boards not now usable back into service. The tops come cut to the exact size of the drawing board, and can be attached in 10 minutes, with the board ready for immediate use.

Further information on this No-Ink drawing-board top, with instructions how to order and attach it, is contained in a folder, copies of which may be secured by those interested direct from the manufacturer. Just mention this item.

## Engineering in Wood

This is the title of a new 48-page booklet discussing the structural features of wood and its use in a wide variety of services, particularly in the war effort. Issued by Timber Structures, Inc., the booklet outlines the engineering, prefabricating and construction service which this firm can render to engineers, architects and contractors in supplying their needs in prefabricated lumber for the erection of structures of various types and sizes.

In addition to its developments in connection with the fabrication of solid and glued-up timber framing and the use of modern timber connectors, this company conducts a continuous program of laboratory research and tests in order further to improve its products by testing the physical properties, strength and performance of materials and fabricated members. In addition to furnishing prefabricated members, fire-proofed or preservative-treated if desired, Timber Structures, Inc., will also furnish the equipment, including hardware and connections, for the erection job as well as the assembling and erection crews under the supervision of men experienced in truss erection.

Copies of "Engineering in Wood", a feature of which is the large number of illustrations showing wood structures of many types for a wide variety of services, may be secured by interested contractors and engineers direct from Timber Structures, Inc., 29th and N. W. Yeon Ave., Portland 8, Ore., or 535 Fifth Ave., New York 17, N. Y.

## Ten Companies Join The Asphalt Institute

Ten additional asphalt-producing companies have been elected members of The Asphalt Institute by its Board of Directors, bringing the total membership up to thirty-seven. These new members are: Bell Oil & Refining Co., Los Angeles; Exeter Refining Co., Long Beach, Calif.; O. C. Field Gasoline Corp., Los Angeles; Five C. Refining Co., Los Angeles; Gilmore Oil Co., Los Angeles; Golden Bear Oil Co., Los Angeles; Inland Empire Refineries, Inc., Spokane, Wash.; Kanotex Refining Co., Arkansas City, Kans.; The Petrol Corp., Los Angeles; and Wasatch Oil Refining Co., Salt Lake City, Utah.

To cover the southern California territory more intensively, the Institute has established an office at 403 Pacific Mutual Bldg., 523 West Sixth St., Los Angeles 14, Calif. Arthur H. Benedict is Engineer in charge.

Buy War Bonds regularly!

## Keep asking for AMERICAN CABLE TRU-LAY PREFORMED WIRE ROPE

● When the outer wires of TRU-LAY PREFORMED finally break after long use, they do not "porcupine" and stick out from the rope as do the broken crown wires of non-preformed rope. They do not become dangerous, chisel-sharp jagers that will tear men's hands even through stoutest gloves. Naturally this advantage enables men to work better with TRU-LAY PREFORMED. They handle it with speed and confidence. They know TRU-LAY is a much safer rope to handle. TRU-LAY PREFORMED's refusal to porcupine affords protection for its own sake, as well as for sheaves, drums, and other equipment which can be injured by protruding wires. Thus, this single feature (one out of many) protects your workmen against dangerous, time-out accidents—extends the service life of your wire rope—reduces needless wear to your equipment.

### AMERICAN CABLE DIVISION

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BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS... TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope,

TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & Cady Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses... In Business for Your Safety

## COMPLETE WELL POINT SYSTEMS

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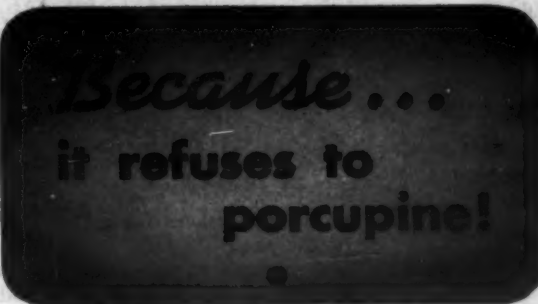
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Because...  
it refuses to  
porcupine!

No wonder  
the Armed  
Forces took  
so much of our  
production!





### Novel Scaffold Aids Erection of Hangar

Small-town carpenters and boys from the bayou and sugar-cane country, most of whom had never before worked on a building higher than two or three stories, substituted for skilled riggers in the speedy erection of one of the Navy's huge new blimp hangars in the South. To help the men to overcome the mental hazard of working 180 feet in the air, a giant movable scaffold, of 2 x 4 southern-pine timbers, was built to progress down the length of the hangar as the work advanced and served the double purpose of providing a place on which to work and a screen to help keep the workmen's eyes off the ground. It was believed that by working from the scaffold, which fitted in under the arched roof, the inexperienced riggers would be relieved of the fear natural to inexperienced men working at the required heights, and this method was proved to increase the efficiency of the men.

The front bay of the scaffold was about 180 feet high, 80 feet deep, and 236 feet wide at the base, tapering off toward the top to conform to the arched space. It was moved on wooden rollers assembled in dollies by means of track jacks against a bucking block. Since the scaffold was built with eleven working platforms on each side, each platform being about 3 feet under the panel points of the arches, the workers when looking down could see only the next lower platform. An electrically operated elevator, running from the floor to the top platform, carried the workers to and from their jobs at the various levels. The scaffold was moved 20 feet from a completed arch to the next section in approximately 20 minutes.

The hangar, designed by the Bureau of Yards and Docks of the Navy, is similar to that of other Navy blimp hangars already erected. The longest clear-span timber arches in the country, with a span of 246 feet and rising 140 feet, constitute the main framing of the hangar. The structure is slightly more than 1,000 feet long, approximately 300 feet wide, and about 190 feet from the floor to the top of the skylight. The fifty-one timber arches in the hangar were assembled with 4-inch Teco splitting or shear-plate connectors, steel bolts, and small steel plates. All timber and lumber used in the hangar was treated for fire resistance. The arch members, comprising approximately 1,000,000 board feet, are of Douglas fir, all pre-cut on the Pacific Coast, while the roof and sides, employing about 1,100,000 feet, are of 2-inch southern pine dressed and matched decking.

In erecting the arches, the first eight panels on each side were assembled on the ground, then hoisted into position on the concrete supports by means of derricks. The remainder of the long arches was then built timber by timber, the workers fastening the truss members with the Teco connectors and bolts and plates as they worked from different

levels on the scaffold. All the pre-cut timbers were marked for their places in the arches, so that it was a comparatively easy job to fit the pieces into their proper places.

At the outset of the job, the contractor planned to erect one of the long arches a day, but toward the end of the work, the erection crew consisting of a few skilled riggers and the rest inexperienced men from the locality, had become sufficiently skilled to complete two arches a day.

### New Division Manager

Announcement has been made by the Gardner-Denver Co., Quincy, Ill., of the appointment of R. H. Rodolf as Manager of the Pump and Compressor Division, following the death of R. J. MacFarland. Previous to his new position, Mr. Rodolf was Assistant Manager of the Portable Compressor and Rock Drill Division of the company. C. M. George, previously of the General Sales Department, has been named assistant to Mr. Rodolf.

### ROBINS REPLACEMENT PARTS WORK EFFICIENTLY IN ANY CONVEYOR SYSTEM

Your present conveyor—whatever its make—will work better, longer if you replace worn-out parts with Robins Idlers, Pillow Blocks, Pulleys, Takeups, Holdbacks and other essentials described in Bulletin 82-CEM-12.

If you have a maintenance or new construction problem—anything concerning the handling of bulk-materials—write to Robins.

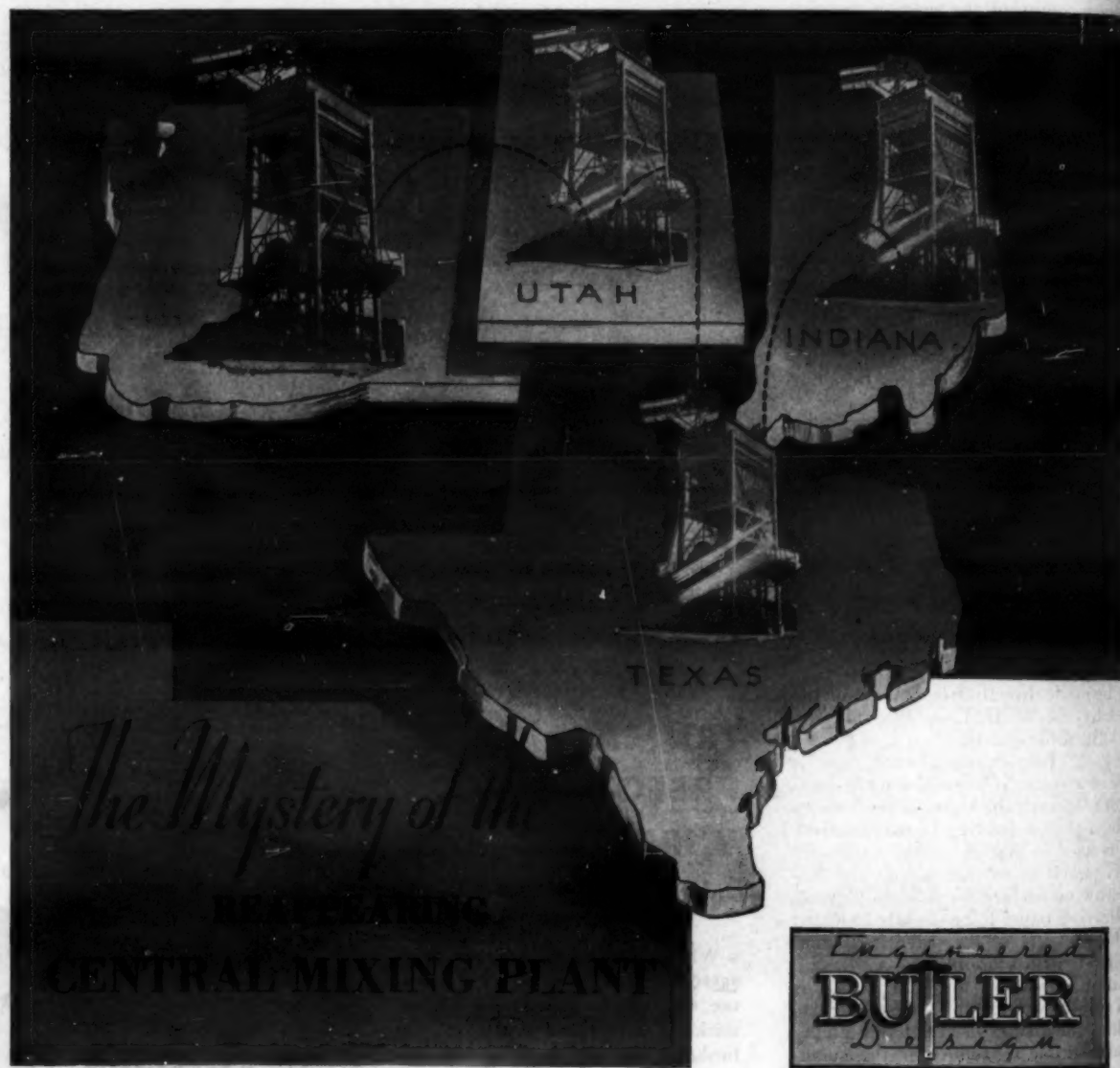
**ROBINS makes:** BELT CONVEYORS • COAL AND ORE BRIDGES • SCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CRANES • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEAR • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING ROAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARIES • WINCHES • WHIRLASSES

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**ROBINS CONVEYORS INCORPORATED**  
Founded in 1896 as Robins Conveying Belt Co.  
PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY



Be on the lookout for a Butler central mixing plant; height about 75 feet; wearing a coat of gray paint; last reported in the State of Washington; has also been seen in Texas, Utah, and Indiana. Has a long record of production—nearly 600,000 cubic yards of concrete poured, and more to come. 150 yards per hour for days on end.

Though it sounds something like a mystery novel, there is really nothing mysterious about the remarkable performance of this plant—it is a Butler Engineered Design. Butler engineers have been designing

plants for more than twenty years, plants whose efficiency, dependability, and versatility are built in. No wonder, then, that they are as good on their tenth job as on their first.

If you have a concrete job, large or small, be sure to call upon the Butler engineer. His suggestions are available to you regarding central mixing plants, ready mixed concrete plants, bulk cement plants, batch bins, and crushing plants. The first step toward the most successful job is Butler Engineered Design.



**BUTLER BIN COMPANY**  
WAUKESHA, WISCONSIN





## Bridge Maintenance Under War Conditions

Annual Inspection and a 5-Year Plan Keep the District Budgets in Order In Indiana

THERE are 3,060 bridges and underpasses of more than 20-foot span on the state highway system of Indiana. These structures are of steel, reinforced concrete, I-beam with concrete deck, and a few wood-pile substructures with concrete deck. In order to systematize bridge maintenance and prevent the "loss" of any structures, as has occurred in some states, each District Bridge and Maintenance Engineer in the six highway districts of Indiana together make an annual inspection of all bridges in their district.

From this inspection a program of extra maintenance is formulated. The bridges are listed for painting and other maintenance according to the need. This is the basis of a 5-year plan. Those structures which need immediate painting, riprapping, or strengthening are put down for attention under the current year's budget. If the two engineers feel that the work is not necessary for one or more years, the bridge is listed for work under a specific later annual budget.

The real purpose of this is to give the district engineers some idea of how their bridge-maintenance budgets are going to increase or decrease in coming years. The 5-year plan is flexible, for each year the reinspection of the structures shows some accelerated deterioration, so that work is needed to be done the current year instead of a couple of years hence, or, fortunately, at times a paint job lasts longer than estimated, so the work can be postponed a year without detriment to the structure.

### General Bridge Maintenance

Indiana uses two coats for painting all steel structures. The undercoat is brown, and the outer, or weather, coat is a special black paint developed by the State Highway Department. The hand-rail and a portion of the end posts are painted white to set off features of the bridge and increase its safety. The end posts are painted for safety, while the painting of the hand-rail serves safety but also dresses it up considerably. By painting the hand-rail annually, the bridge is greatly "freshened up".

Other maintenance work which is watched with particular care is the flow line of the stream around the abutments and piers and, where any scour is noted, riprap is placed immediately. The hand-rail has to be straightened and repaired frequently when run into by vehicles, and the joints in the concrete decks have to be poured regularly as a part of maintenance.

### Contract Painting Problems

Because of the loss of the younger more active men who do the bridge painting, it was decided this year in Indiana to award contracts for the painting of those steel bridges which needed immediate attention. Eleven painting contracts were awarded, with bridges in one district grouped as much as possible to make the contracts attractive. Practically all of these structures are bridges with spans of around 100 feet or more, and the total required 15,000 gallons of paint, which the contracts required the State to furnish.

State specifications require a minimum of 4.5 pounds of linseed oil per gallon of paint, but with the Government restrictions on the use of linseed oil, it has been necessary for the State to reduce this amount by the use of thinners. In general, all paint used for highway work, either bridge paint or traffic paint or for guard rails, is made at the Penal

Farm, but when linseed oil could not be purchased in sufficient quantities, bids were asked for furnishing paint which would reasonably meet state specifications. This resulted in one offer of 2,400 gallons of paint, which was not enough to take care of any one of the eleven contracts.

As a result of this, it was necessary to terminate nine of the eleven contracts. Attempts will be made this winter to secure enough paint so that this work may be readvertised next spring.

Bridge maintenance is under the jurisdiction of Norman F. Schafer, Superintendent of Maintenance, State Highway Commission of Indiana, of which S. C. Hadden is Chairman.

### New A. I. S. C. Officers

The American Institute of Steel Construction has elected the following new directors of the Institute to serve for three years: Clyde G. Conley, Mount Vernon Bridge Co., Mt. Vernon, Ohio; Art J. Dyer, Nashville Bridge Co., Nash-

ville, Tenn.; Henry Bohnsack, International Steel Co., Evansville, Ind.; Edward K. Klingelhofer, Pittsburgh Bridge & Iron Works, Pittsburgh, Pa.; Clyde MacCormack, Phoenix Bridge Co., Phoenixville, Pa.; R. C. Mahon, The R. C. Mahon Co., Detroit, Mich.; P. F. Gillespie, Judson-Pacific Co., San Francisco, Calif.; and W. M. Wood, Mississippi Valley Structural Steel Co., Decatur, Ill. The new directors have elected the

following officers to serve until the annual meeting of the Board in 1944: President, Clyde G. Conley; First Vice President, Clyde MacCormack; Second Vice President, Edward K. Klingelhofer; Treasurer, T. R. Mullen, Lehigh Structural Steel Co., Allentown, Pa.; Executive Vice President and Assistant Treasurer, Robert T. Brooks; Manager, L. Abbett Post; Secretary, Roberts B. Thomas.



## VICTORY Para-Plastic

AN ELASTIC BOND SUSTAINING WATERPROOF ADHESIVE SEAL  
HOT POURED, RUBBER-LIKE, EXTENSIBLE  
AT LOW TEMPERATURES

Many engineers are finding that Victory Para-Plastic Sealing Compound solves construction and maintenance problems connected with expansion joints in concrete pavement. To visualize the tremendous superiority of Para-Plastic over ordinary asphalt seals, please study the three photographs shown here.

**1.** Both test blocks have been prepared using Serviced 1" Fiber Expansion Joint Filler; however, the joint at the left has been finished with a top seal of the ordinary asphalt type, while the joint at the right has been sealed with Para-Plastic.

**2.** Both joints have been compressed to 1/2-inch thickness as would be the case in a concrete pavement when the slabs expand due to heat. As expected, the non-extruding fiber joint has compressed within its own volume and thereby has permitted the joint seals to remain in place.

**3.** The blocks have returned to the original position as would be the case when concrete slabs contract due to cold. In both joints the fiber joint has re-expanded to 70% of its original thickness but this still leaves an opening between the fiber filler and the blocks on one side. In the case of the asphalt seal at the left, the joint is wide open at the top permitting water to run through the joint from top to bottom. In the case of the Para-Plastic seal at the right, the bond with the concrete remains unbroken (it can be stretched another 1/2 inch without breaking) and no water can pass through the joint since the top is permanently sealed.



Serviced Victory Para-Plastic Sealing Compound complies with Fed. Spec. SS-F-336 and C.A.A. Spec. P-605. For additional information and prices write today.

**SERVICISED PRODUCTS CORP.**  
6051 West 65th Street, Chicago 38, Ill.



## Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

### Changes in Job Orders During Progress of Work

There was some elasticity in a bridge contract under which the State of New York was empowered to change the character of work to be done without being deemed to have gone beyond the bounds of the agreement. But the State tried to stretch the power too far, resulting in its breach of the contract.

The contract called for piles ranging up to 80 feet long, which were obtainable in the New York market. But the engineers ordered changes which required large numbers of piles 84, 89 and 95 feet long, involving the use of different types of lumber. The substituted piles had to be transported from greater distances and involved slower and more expensive driving.

Affirming an award of damages in favor of the contractor, the Appellate Division of the New York Supreme Court said:

"When the State, by its construction orders, required the changes to be made, it obligated itself to pay for the extra work. The fact is immaterial that the original plan and specifications provided that 'there is no expressed or implied agreement that depths or the character of the material encountered have been correctly indicated and bidders should take into account the possibility that conditions affecting the cost and quantities of the work to be done may differ from those indicated.'" (Westcott v. State, 36 N. Y. Supp. 2d, 23.)

The court cites cases in which the New York Court of Appeals has awarded contractors extra compensation on account of being required to furnish steel varying in weight and number of units from those specified by the contract, and where a dam was changed from masonry to earth construction.

### Contraction of Typhoid Regarded as "Accident"

When a contractor elects to furnish his workers the water they need to slake their thirst while on the job, he is not bound to furnish them the best obtainable. But he is bound to furnish water that is uncontaminated. If he fails to do so, he will be held accountable for any resulting illness of an employee or employees. So ruled the Illinois Supreme Court in the case of Permanent Construction Co. v. Industrial Commission, 43 N. E., 2d, 557.

Two employees of a contractor developed typhoid fever from drinking water furnished them while at work. Deciding that the occurrence must be regarded as an "accident" in such sense as to make the employer liable under the Illinois Workmen's Compensation Act, the court said:

"It was to his—the contractor's—advantage to furnish drinking water to its employees at the place where they were employed, rather than to permit employees to leave their work and place of employment to go to a tap of the water supply."

"Though the Workmen's Compensation Act does not make an employer an insurer of the safety of his employees, yet when an employer elects to furnish its employees with drinking water, it is bound to use and know that the water furnished is free from deleterious substances, liable to cause accidental injuries to its employees."

### Contract Withstands Several Legal Attacks

Several important fundamentals of construction contract law were applied by the United States Circuit Court of Appeals, Eighth Circuit, in the case of Phillips Petroleum Co. v. Rau Construction Co., 130 Fed. 2d, 499. The gist of the decision is as follows:

A contract to place approximately 12,000 cubic yards of concrete in units, for which the owner was to furnish plans as the work progressed, was not invalid or unenforceable on account of being indefinite as to the work to

be done. This is particularly true where any uncertainty was removed by completion of the work according to the plans furnished by the owner. Therefore, the contractor could not disregard the measure of compensation provided for by the contract, and collect on the basis of the reasonable value of the work done.

Nor was the contract nullified by its provision that the owner might suspend or abandon the work at will, where it contained another provision fixing the damages to be paid the contractor in case of suspension of the work or termination of the contract by the owner. An unperformed contract which enables either party to cancel it without restriction is not binding upon the other party, because there is no such mutuality of obligation as is essential to a binding contract. But the contract is validated by its performance.

By accepting and cashing a check tendered as full payment for work done, a contractor loses any right to assert that a balance remains due him.

### Measuring Damages For Delay by Owner

When a contractor sues an owner for damages and proves that the owner broke his part of the contract, he gets to "third base". But before he can score, he must prove with approximate accuracy how much money he is out of pocket on account of the breach. Many a lawsuit has been lost by one who has been wronged through failure to prove damages measured, as permitted by law. So, the "measure of damages" for breach of a construction contract is always a matter of interest and importance.

Where a contractor sued for damages on account of being delayed by the owner, the United States Circuit Court of Appeals, Sixth Circuit, decided, concerning the assessment of damages, (Grand Trunk Western Railroad Co. v. H. W. Nelson Co., 116 Fed. 2d, 823):

If the contractor's equipment that was idle through the owner's fault had a definite rental value, that value during the period of idleness is a proper item of damage.

Where a contractor's association had issued a schedule that was customarily used in determining the cost of maintaining equipment, it was admissible as evidence on that point. A fair portion of the contractor's overhead expense may be allocated to the particular job as an element of damage.

As a general rule, an owner's liability for

damages and the amount thereof do not become fixed until assessed by a judge or jury, and interest is not allowable prior to that time.

### Dual Status of Employees

That a contractor's foreman or superintendent may be an employee in that capacity and yet at the same time be an independent contractor in another capacity is shown by a decision rendered by the Georgia Court of Appeals. (Blakely v. United States Fidelity & Guaranty Co., 21 S. E. 2d, 339.)

Blakely was fatally injured while handling equipment belonging to a road contractor, and his widow sought an award against the contractor under the Georgia Workmen's Compensation Act. The court denied an award on the ground that Blakely was the employee of one Melder, whose status was that of independent haulage contractor for the road contractor. Normally, Melder was the road contractor's foreman, but the evidence showed that he had taken a special contract from his employer to haul equipment from one point to another. These facts were held by the court to characterize Melder, for the time being, as an independent contractor, and not an employee, as he was paid a lump sum for the hauling and was required to furnish his own truck and help. The road contractor retained no control over the time or method of hauling the equipment.

## THEY'RE FIGHTING FOR VICTORY

Littleford Black Top Construction and Maintenance Units are fighting all over the world for Victory. They are building Runways, Roads, Highways, etc., to speed the day of peace. Pressure Distributors, "Tanker" Heaters, Road Brooms, and Supply Tanks are in all theatres of War.

After Victory these proven Littleford Units will again speed up the Construction and Repair of our Highways and Airport systems. On the battlefield and at home, Littleford units give the most efficient results. Remember to purchase your Post War Black Top Construction and Maintenance Equipment that bear the Littleford Trademark.

Upper Left, Road Broom—Lower Left, "Tanker" Heater—Bottom, "Spray Master" Pressure Distributor—Right, Bituminous Supply Tank

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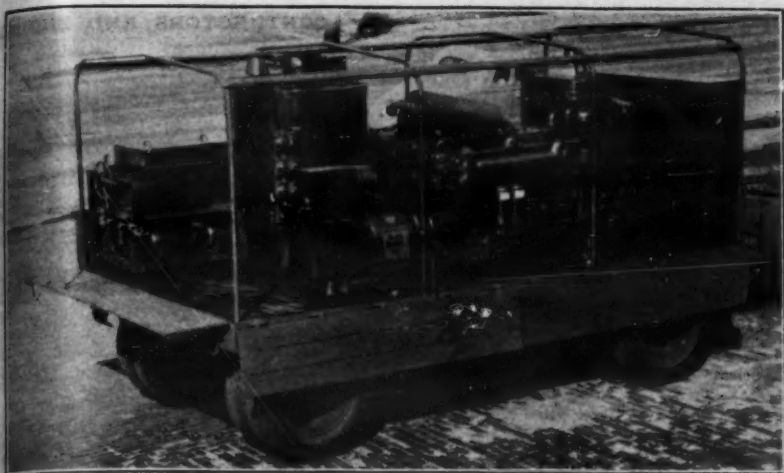
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## LITTLEFORD

LITTLEFORD BROS., INC.  
425 E. Pearl St., Cincinnati, Ohio





The new Youngstown-Miller mobile lubricating-oil reclaiming unit.

### Oil-Reclaiming Unit Now Trailer Mounted

The conservation and transportation of lubricating oil has become a very serious problem. To help "keep 'em rolling" at the fighting front, the Youngstown Miller Co., Sandusky, Ohio, has designed, built and delivered to the Marine Corps a mobile lubricating-oil reclaimer for use just back of the lines.

Mounted on the trailer is a standard Y-M reclaimer, a diesel-electric generating set, a clean-oil storage tank, a fuel-oil tank, and waterproof storage bins for refinery earths, filter papers and spares. In operation, a charging pump conveys the dirty oil from drums on the ground to the heating tank where it is brought to a sufficient temperature in intimate contact with refinery earth to dissipate the volatiles. The heating process is controlled by thermostats, and when the proper temperature is reached, the oil is dropped into a transfer tank, then forced through a two-stage filter by compressed air and out to clean oil receiving drums.

Although designed and built for military service, such mobile units would be entirely adaptable to service on construction jobs, both those now speeding toward completion for war purposes and peacetime jobs when the war has been won. Further information on the Y-M line of oil reclaimers and on this mobile unit may be secured direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

### New Conveyor Belt Of Synthetic Rubber

Generally comparable in all respects with pre-war high-quality conveyor belts, a new super-quality synthetic-rubber conveyor belt has been announced by the Goodyear Tire & Rubber Co. In addition to comparing favorably in flex life, ageing and resistance to abrasion and cutting, this new belt has the additional advantages of resisting oil and high temperatures, the manufacturer states.

Designated as the Style SS, this new belt replaces a previous type of synthetic-rubber conveyor belt over which the new one is a vast improvement, it is reported. The new belt is particularly adapted to the transportation of gravel, aggregate, and similar materials.

of industrial rubber goods to synthetic rubber. This includes transmission, conveyor and elevator belts, V-belts, hose, rolls of all kinds, molded products and similar items. Goodyear states that in many cases exhaustive tests of synthetic-rubber products have shown them to be superior to those made of natural rubber, particularly in resistance to oil, acids, detergents and such materials, and to the effects of wide temperature variations.

Further information on the features and availability of this new synthetic-rubber conveyor belt, as well as other industrial rubber goods, may be secured by those interested direct from the Mechanical Goods Division, Goodyear Tire & Rubber Co., Akron, Ohio, by referring to this item.

### New Hardening Solution For Steel Tools, Parts

Steel-temp, a new hardening solution for use in heat-treating steel tools and parts to provide longer life, toughness,

and resistance to wear, is described in a new folder issued by the Steeltem Chemical Co., 51 E. 42nd St., New York City. Developed to simplify the heat-treating process, Steel-temp is a special-formula chemical solution in which the heated steel part or tool is quenched. It works equally well with either water or oil-quenching steels, and is easy to use as no tempering is necessary.

Its producer states that Steel-temp hardens the cutting edge of any tool steel, prolongs the life of all types of edge tools because its special formula imparts toughness and hardness, and saves time and labor in the heat-treating process. Steel-temp-quenched tools stand greater punishment and need fewer grindings because the cutting edge survives more impact without becoming battered, it is reported.

Copies of this folder and further information on Steel-temp, which is available in 5, 10, 30 and 55-gallon containers, may be secured by those interested direct from the producer by mentioning this item.

Coincident with the announcement of this new conveyor belt, Goodyear's Mechanical Goods Division reported the conversion of a major portion of its line

# 3-WAY SERVICE TO MEET YOUR REQUIREMENTS

## BRING IN

Here is a PROVED better, faster, more economical service plan. By handling the hauling of your own outfit to and from the dealer's shop... you save time waiting for it to be picked up and delivered. You cut the cost of repairs, too... by having your operator bring in the machine. He can "pitch in" and help speed the job along... and learn plenty about the care and maintenance of the outfit. He can also act on your behalf when unforeseen problems arise.

## PICK UP

At all times your Allis-Chalmers dealer has gone "over-board" to serve you. Even under wartime conditions he is doing a mighty fine job. Unusual war demands may sometimes prevent his giving you the usual pick-up service... but rest assured he will do his best. It will help if you can anticipate your needs — let him know ahead of time approximately when you want him to call for your outfit. If it is at all possible, he will be there. Be sure to instruct him clearly as to what you want done... and your unit will be repaired exactly as you want it.

## ON THE JOB

You'll find your Allis-Chalmers dealer well equipped for field repairs. His service cars have time-saving tools for every emergency... operated by field mechanics highly skilled in their work. After a diagnosis of the trouble... your unit will be quickly put back in operation if it is only a matter of making adjustments or minor repairs. When major repairs or a complete overhaul are necessary it is best to have the work handled in the dealer's shop — where the necessary parts and proper tools are available.

No matter which of the three ways you want your repairs handled, you'll find your Allis-Chalmers dealer fully cooperative. It will pay you many times over to deal with him — for high quality work, quick service and greater economy.



# ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE, U.S.A.

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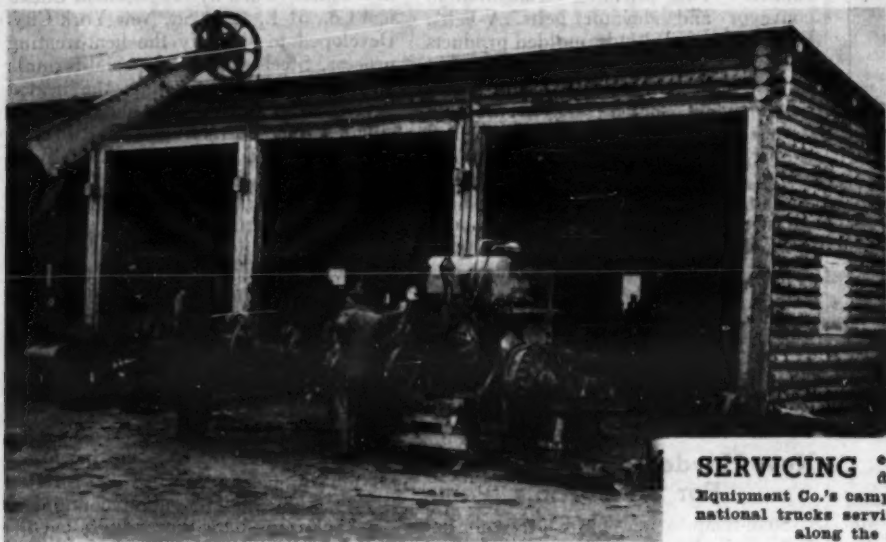
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**SERVICING** equipment on the Alaska Highway. At left, a TD-18 diesel crawler tractor being overhauled at the Massif Equipment Co.'s camp between Watson Lake and Whitehorse; right, International trucks servicing an International tractor and bulldozer working along the shore of Teshin Lake in Yukon Territory.

**AIRPORT.** Construction scenes at an airport in Newfoundland, for which the McNamara Construction Co., Ltd., of Leaside, Ontario, is the contractor. Below, a LeTourneau rooster pulled by a D8 tractor breaking up the rock; right, Athey crawler wagons being loaded by a Caterpillar-diesel-powered dragline; far right, a Caterpillar D7 hauling the loaded Atheys.



*Field Photos*  
*T*

**ALEUTIANS.** Leveling a fill at a Navy small-boat landing area in the Aleutian Islands, at right, LaPlant-Choate and LeTourneau bulldozers on D8's are the construction units at work on this fighting front.

Official U. S. Navy Photo



**NEW DAM.** Work progresses rapidly on the Wolf Creek Dam project in Kentucky, part of the U.S.E.D. Ohio Valley flood-control program. At left, backfilling a rock crevice and, below, tamping rollers at work. H. A. Healy Co. of Chicago is the contractor.







**COLORS.** Commander Richard B. Cook, Officer in charge of the 99th U. S. Naval Construction Battalion, accepts the Lone Star colors of Texas from Lieut.-Commander Ian H. Morgan in impressive ceremonies at which the Governor of Texas adopted this Seabee unit and gave it the name of Lone Star Battalion. Commander Cook was formerly a contractor in Huntington, W. Va., and Lieut.-Commander Morgan was County Engineer of Travis County, Texas.



**ROCK WORK** on a Columbia Construction Co. job at Catalina Island. The 25-cubic yard rock-type dump body is mounted on a Maxi-Engineered heavy-duty truck chassis.

## Tell Their Stories



**DRAINAGE.** Work on the Highway in 1943 included the installation of culverts to take care of the drainage problem. Above, the 1942 version of the highway, showing the corduroy which was replaced this year; right, above, Armco drainage pipe, nestable to simplify transportation; right, below, Armco 36-inch nestable pipe installed in swampy ground.

**DOWN UNDER.** Excavating for the foundation of a new broadcasting station in Auckland, New Zealand. The Trackson Traxcavator, shown at left, handled 500 cubic yards of clay a day, keeping five trucks busy on a 1-mile haul.



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DEC

43



# Resurfacing Methods Employed in Alabama

## Choice of Type Depends on Character of Pavement or Base to be Protected; State Crew or Contract Work

+ INSTITUTED as maintenance measures and developed as such, the methods of resurfacing used by the Alabama Highway Department are now paying big dividends when broken concrete pavements cannot be replaced but must carry traffic and loads which speed their disintegration, and old bases need strengthening.

The resurfacing methods include: **Light Penetration Surfaces** which may be used to repair broken concrete or as an armor coat on prepared base courses, varying from 1 1/4 to 1 3/4 inches thick, depending on the per cent distribution of the screen sizes; **Single Surface Treatment** on prepared base courses, using a tar prime, hot bitumen and a graded slag giving a new surface 1/2 to 1 inch thick; and **Pre-Mix Seal**, used to strengthen old pavements or surface treatments to give a smoother riding surface with less impact and consequently less damage to the base through heavy loads, applied 60 pounds per square yard, giving a 1/2-inch layer, which is reduced to 3/8-inch thick when it is pressed into the surface voids by long rolling or traffic compaction. On light penetration courses where a choke course has been used, a 70-pound or 100-pound pre-mix seal will add from 1/2 to 3/4 inch, respectively, to the thickness.

As examples of these three types of surface treatments, we present three jobs completed during the summer of 1943, one by contract and two by state forces with convict labor.

### Light Penetration Surface

A light penetration surface was laid during the summer on U. S. 31 from the junction of U. S. 80 south to the county line, a distance of about 15 miles. The state maintenance crew under E. B. Lloyd, Bituminous Superintendent, completed about a mile each working day. A Rosco 880-gallon distributor mounted on a Ford truck applied RT-12 at the rate of 0.35 gallon per square yard to the concrete pavement, half of the road at a time in order to maintain traffic. This was immediately covered with 63 pounds of 3B slag per yard by St. Paul spreader boxes set to spread 7 feet wide and then followed by one of the four boxes cut to spread 2 feet wide to care for the balance of the half width. This was hand-spotted by brooming to an even

layer and then rolled by a 5-ton Galion portable tandem roller.

After rolling was completed, the layer was dry-choked with 6B slag at the rate of 13 pounds per square yard, hand-spotted, and rolled by a 10-ton Galion tandem roller. The seal consisted of a shot of 0.55 gallon of RT-12 per square yard covered with 21 pounds of 6B slag per square yard and rolled again by the 10-ton roller. The final surface on this will be 70 pounds of the plant-mix seal.

SCREEN SPECIFICATIONS FOR SLAG		
Total Passing	Per Cent by Weight	
	No. 3B Slag	No. 6B Slag
2 -inch sieve.....	100	100
1 1/2 -inch sieve.....	90 to 100	100
1 -inch sieve.....	20 to 40	100
3/4 -inch sieve.....	0 to 15	100
1/2 -inch sieve.....	90 to 100	100
3/8 -inch sieve.....	40 to 80	100
No. 4 sieve.....	0 to 25	100
No. 10 sieve.....	0 to 6	100

Before the surfacing crew started to work, another outfit cut out all cracks and expansion joints and filled them with a crack filler made up of sawdust and asphalt. The penetration crew used sixteen trucks on a 2-mile haul. At the siding where the slag and asphalt were unloaded, there was a 12-hp vertical steam boiler for heating the asphalt tank car, and a conveyor with seven men unloading from cars and another seven hand-loading from the stockpile. The bituminous crew on the road consisted of thirty-one men, including distributor and truck drivers, and the spotting crew another twenty-six men, of which four were on joints and two on flagging traffic. A total of forty prisoners was used in the entire operation. Two feeder trucks of 900 gallons each were used for hauling tar to the distributor.

This type of treatment has a value not appreciated heretofore but which adds greatly to the effectiveness of a surface treatment. The slag being an open-type aggregate and the bottom layer of the treatment being a coarse slag, an insula-

tion layer is thus provided which vents the heat absorbed by the black top of the pre-mix seal being transmitted to the concrete base and causing excessive expansion in the concrete. This also reduces the percentage of cracks coming up through the surface treatment.

### Single Surface Treatment

One typical single-surface-treatment project is a contract, FAS 353 awarded to W. M. Ford of Lafayette, Ala., for 5.968 miles on Alabama near Lowndesboro. The treatment was over an 8-inch clay-gravel compacted base course primed with 0.27 to 0.30 gallon of RT-3 per square yard, applied 22 feet wide for a 20-foot treatment. The prime was followed by a hot application of 0.37 to 0.40 gallon of RT-12, or as an alternate, AC-8 or 15, having penetrations of 80 to 120 and 150 to 200 respectively, heated to 325 degrees for application. This was covered with 0.42 cubic foot of No. 5B slag per square yard and rolled by a 5-ton tandem roller

(Continued on page 50)



**Important**  
include LIMA  
Shovels, Cranes  
and Draglines  
in your plans for  
the future.

This war has brought about a keener appreciation of the fine qualities found in LIMA shovels, draglines and cranes. For years LIMA has been first choice among leading contractors, but not until the pressure of war was applied did users realize fully how much LIMA'S modern features meant in the execution of a job that had to be finished in double-quick time. Today practically every LIMA is being assigned to the armed forces. But tomorrow, LIMA will be manufacturing a better and more efficient product than ever for the user who is planning for the future. While you are waiting for the opportunity to buy a new excavator wouldn't it be a good time to learn about LIMA. Descriptive bulletins available on types and sizes listed below.

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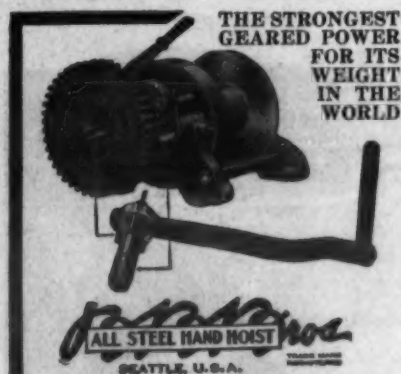
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Narrow winding curves on the Lewis River Road in Cowlitz County, Wash., are being eliminated by the relocation of the route. Here a LaPlant-Chaste trailbuilder on a D7 is making a 15,000-cubic yard cut and fill on the project.

## Urges Planning Now For Post-War Work

America must begin to visualize the post-war problem, not as an excursion into the realm of fancy, but as one demanding an immediate survey of peacetime needs, Clyde G. Conley, President of the American Institute of Steel Construction, told its annual convention recently.

Speaking to more than 300 members of the Institute, Mr. Conley prophesied a bright future for the steel fabricating industry to meet the demands of both domestic and foreign construction in the post-war period. He declared: "While these demands will bring novel problems of engineering and production, the lessons which your recent changes in production methods have taught you should be of material assistance. It is my feeling that we have entirely demonstrated the versatility and the adaptability of the structural fabricating shops."

After pointing out the ability of American industry to meet all expected demands, Mr. Conley said: "As I believe it is the obligation of industry to think and plan now in terms of meeting both this domestic and foreign demand, I believe it is the obligation of government to recognize the compatibility between its own humanitarian aims and our desire to make the fullest use of our resources and abilities. To a certain extent the leaders of democracy have articulated what they feel to be the needs of the future. Industry can meet these needs. For

this reason I think it is clear that excessive taxation and other handicapping legislation which would hamper and put

obstacles into the way of this development are not in accordance with this program."

## New Process Protects Metals from Corrosion

Corronizing, a new rustproofing process in which a number of very thin layers of metals and alloys having unusual corrosion resistance are electroplated on metal base stocks, is described and discussed in a folder recently issued by the Corronizing Division of the Standard Steel Spring Co. The folder states that thousands of Corronized coating tests have been made over a number of years and indicate its rustproofing qualities.

Before the government limitation order on the use of nickel, Corronizing was used on motor parts, wire cloth and screen, steel sheets, springs, and other items exposed to the effects of weather. Since that time, the Corronizing process has been improved and brought up-to-date to meet the problems of war production, and many other applications are

anticipated for the post-war era.

Copies of this folder on Corronizing may be secured by those interested direct from the Standard Steel Spring Co., Corronizing Division, Park Bldg., Pittsburgh 22, Penna., by mentioning this review.

## New General Catalog On Flexible Metal Hose

The features and many uses of Rex flexible metal hose and couplings are described and illustrated in a 38-page catalog issued by the Chicago Metal Hose Corp., Maywood, Ill. Rex-Weld, Rex-Tube and Avioflex metal hose are designed for use as oil, compressed air or gas lines, for asphalt and tar tank-car unloaders, for centralized lubrication systems, for diesel exhaust hose, for fuel and oil hose, and as vibration absorbers for compressors, pumps, and turbines.

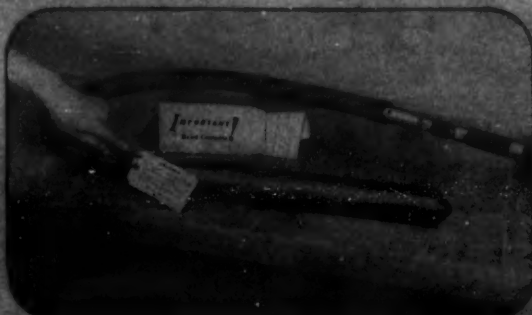
Copies of this Catalog G-42 may be secured by interested contractors and engineers direct from the manufacturer by referring to this item.

# Four Maintenance Operations THAT CUT REPAIR COSTS



CP Pneumatic Concrete Vibrators are well designed and ruggedly built — yet they need simple care to keep their efficiency high and their repair costs low. By cleaning and draining your vibrators at the end of every shift — by keeping them properly lubricated — by following the printed instructions that come with every tool — you keep your vibrators operating at maximum efficiency.

## HOW TO GET MAXIMUM PERFORMANCE FROM CP CONCRETE VIBRATORS



1 Study Instruction Sheet and Caution Card carefully before putting tool in service.



2 Clean concrete from throttle and exhaust port before putting away at end of shift.



3 Check exhaust screw at frequent intervals. It must always be kept securely tightened.



4 After using, hang vibrator with nose up to allow condensate to drain from working parts.

Rebuild your  
**TRACTOR GROUSERS**  
WITH **BULLDOG**  
*Grip-Lugs*



Send for Bulletin "C-1"

INCREASES TRACTION  
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DIESEL ENGINES  
AVIATION ACCESSORIES



## Louisiana Airport Completed Quickly

(Continued from page 13)

trifugal pump which delivered the Tru-Cure curing compound with a red dye for easy identification of the areas sprayed.

### Shoulder and Clean-Up

On the shoulders there was considerable trimming to be done because of the damage by the hatch trucks. This was corrected by a pair of LeTourneau Model 6 scrapers and blading. Final smoothing of the shoulders was done with a long-wheel-base land leveler. No seeding of the shoulders or the field in general was required because of the rapidity with which the soil in the section naturally acquires a sturdy weed growth and healthy patches of Bermuda grass. In order to stimulate the spread of the Bermuda grass, which grows from its own clippings, and to prevent its being choked out by the weeds, the contractor used a Farmall tractor equipped with an International power mower for cutting the weeds.

The final cleaning of the concrete runways was done by the Littleford power broom and blower, particularly at the edges where the Prismo glass-bead identification stripes and other markings were placed.

### Major Quantities

The major quantities involved in this contract, supplemental agreements and change orders, according to the preliminary final estimate, were:

Clearing	75 acres
Clearing and grubbing	55 acres
Field grading	550,000 cu. yds.
Imported fill, "batture"	425,000 cu. yds.
Concrete paving	273,000 sq. yds.
Concrete pipe, reinforced, 54-inch	1,300 ft.
" " " 48-inch	2,073 ft.
" " " 42-inch	3,361 ft.
" " " 36-inch	4,800 ft.
" " " 30-inch	3,930 ft.
" " " 24-inch	5,400 ft.
" " " 18-inch	1,800 ft.
" " " 15-inch	1,105 ft.
Concrete pipe, plain, 8-inch	3,800 ft.
Concrete pipe, perforated, 8-inch	50,800 ft.
Pipe junction boxes	42
Ducts, 2-inch	3,660 ft.
" 4-inch	1,160 ft.
" 6-inch	310 ft.
" 8-inch	470 ft.
Prismo stripes, 6-inch	230,000 ft.

Some interesting figures on the amount of work required to accomplish some of the items in this contract were computed by the Superintendent, George D. Williams. There were over

200,000 truck loads of imported fill hauled 4 miles or an 8-mile round trip for the trucks, or a total of 1,600,000 truck-miles. There were 30,000 batch trips of 3 miles round trip or an additional 90,000 truck-miles traveled right on the field itself.

### Personnel

The original contract for the grading and paving of this field was in excess of \$1,000,000, with some additions for supplementary work and change orders. The work was done for the Civil Aeronautics Authority by the Galveston District, U. S. Engineer Department, under a contract awarded to T. L. James & Co., Inc., of Ruston, La. For the Engineer Corps, the work was in charge of Lieut. J. M. York, Area Engineer. For the contractor, George D. Williams was Superintendent in charge of the concreting and Joe E. Lacy was Superintendent in charge of the grading.

Buy Bonds regularly and keep 'em firing, on land, sea and in the air.

## Road Across Andes Aids Peru Commerce

The last link in a 572-mile highway from the Pacific coast port of Callao, Peru, across the Andes Mountains to the small river town of Pucallpa will open the jungle country beyond the Andes to overland traffic. In addition to its immediate role in the transportation of war-vital materials, the highway will be of great importance to the permanent development of the region around the Peruvian tributaries of the Amazon. Vessels up to 3,000-ton displacement can make the voyage between Pucallpa, on the Ucayali River, and the Amazon port of Iquitos, to which ocean-going freighters come up from the Atlantic.

The final link of this highway extends 250 miles from Huanuco to Pucallpa. It is generally from 20 to 25 feet wide and is partly gravel. At present only one-way traffic is permitted along some of the mountain sections. The older part of the road, a 150-mile stretch from Callao to Oroya, is surfaced with asphalt while

the remainder is gravel-surfaced.

The highway is a remarkable engineering achievement. From the port of Callao it ascends within approximately 90 miles to the Andean pass of Anticoma, 15,900 feet above sea level; at Huanuco it drops again to 6,000 feet; beyond Huanuco it ascends the Blue Cordillera, then passes on to jungle terrain.

At the Aguaytia River, a bridge 2,600 feet long is being built. The concrete piers and steel superstructure are being pushed ahead so that the bridge will be in service early in 1944.

### A New Oil Pipe Line

A new 82.5-mile oil pipe line is about to be constructed, from the Tensleep Reservoir in the Elk Basin Field in southern Montana, to connect with refineries in Laurel and Billings, Montana. The new line, which will have a capacity of 15,000 barrels of crude oil daily, will be built for the Yale Oil Pipeline Co., of Denver, Colorado, at a cost of approximately \$830,000.



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## PEACETIME TRANSPORTATION ON A WAR JOB

NEARLY every Diesel engine General Motors makes now goes to work for Uncle Sam.

Most of them go right into the fighting—into tanks, trucks and tractors, into combat ships, patrol boats and landing barges.

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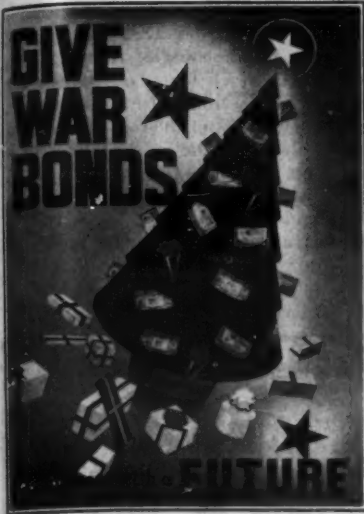
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### Wood Preservative Treatment in 1942

The total volume of treated timber reported in 1942, according to R. K. Helphenstine, Jr., of the U. S. Forest Service in *Wood Preserving News*, amounted to 3,755,215,452 board feet. Mr. Helphenstine has included, for the first time, a report on the amount of timber given fire-retarding treatment. This treatment, which also provides a certain amount of protection from decay, was given to 22,284,402 board feet of timber.

More piles were treated in 1942 than in any previous year. The total was 42,179,210 linear feet, an increase of 10,279,643 linear feet over 1941, or 32.22 per cent. Southern-pine piles constituted 63.55 per cent of the total; Douglas fir, 34.83 per cent; and the remainder were red pine, oak, ponderosa pine and other miscellaneous species.

The use of construction timbers and miscellaneous timbers and lumber, including heavy timbers such as stringers, caps, sills, etc., for the construction of bridges, docks, trestles, etc., sheet piles, joints, plank, wood blocks, cross arms, lumber for posts, mine ties, conduit, pipe staves, etc., was the highest ever reported.

The consumption of creosote and creosote-coal-tar solutions in 1942 was 216,347,768 gallons, an increase of 879,988 gallons over the 1941 figures. Mixtures of creosote and petroleum, used mainly for treatment of cross ties and switch ties, increased from 62,864,714 gallons in 1941 to 69,264,281 gallons in 1942. There was a decrease of 1,001,797 gallons of petroleum, which indicates a greater percentage of creosote in the creosote-petroleum mixtures.

Straight zinc-chloride treatment decreased from 1,403,863 pounds to 1,063,500 pounds and chromated zinc chloride from 4,382,561 pounds to 3,987,763 pounds. Wolman salts decreased from 1,656,104 pounds to 1,307,830 pounds. Zinc-Meta-Arsenite decreased from 268,795 pounds to 239,786 pounds. Celcure decreased from 310,921 pounds to 249,713 pounds. Miscellaneous liquid preservatives increased from 136,074 gallons to 194,589 gallons.

Creosote or a creosote mixture was used for the treatment of 94.75 per cent of the total 1942 output of treated timber; 79,588,116 board feet was treated with zinc chloride or chromated zinc chloride; and 59,439,408 board feet with Wolman salts. The remainder, about 1 1/2 per cent of the total, was treated with fireproofing chemicals, Celcure, Zinc-Meta-Arsenite, and other materials.

A total of 5,151,284 pounds of chemicals was used for fire-retarding treatment. More than half of this amount, 2,711,623 pounds, was Protexol. Other materials used were: Minalith, 1,593,248 pounds; chromated zinc chloride, 362,514 pounds; borax-boric acid, 483,899 pounds.

During 1942 a total of 231 treating plants was in operation, one more than was reported in 1941. Of these 187 were commercial plants treating wood for sale

or by contract; 22 were railroad plants; and 22 were owned by public utilities and mining companies.

### New Manual and Catalog On Flexible Couplings

A combination of engineering manual and catalog containing a comprehensive list of flexible couplings and fittings for use with grooved pipe, as well as a guide to their use in various types of service, has recently been issued by the Victaulic Co. of America.

In announcing this catalog-manual, the company pointed out that, while most of its present activities are of a secret military nature, Victaulic couplings have played an important part in laying temporary military pipelines in North Africa and Sicily. It is reported that they made it possible to lay pipe at the rate of 10 to 30 miles a day.

Copies of this Victaulic Handbook may be secured direct from the company, located at 30 Rockefeller Plaza, New York City. Just mention this item.

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# Block Buster

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While Allied bombers are pulverizing Ruhr Valley dams we on the home front are constructing them at phenomenal speeds.

Modern construction equipment like the modern bomber is the result of today's finest engineering geared to war's necessities. Hunkin-Conkey Construction Company used Barber-Greene conveyors to place 80,000 cubic yards of processed crushed shale, clay and earth per week in building a 3,093,000-yard embankment for "Big Yock", the Youghiogheny dam in Pennsylvania.

Main conveyor is 275' x 42" and carries material out to stacker. Stacker is 65' x 42" and swings through 150° horizontal plane from top of 100' tower.

# BARBER-GREENE

AURORA ILL.



## Falsework Erection For 190-Foot Bridge

(Continued from page 21)

combined in the proper proportions.

Pouring of the concrete for the piers and pedestals was carried on from October 22 to December 11, with some delays due to cold weather, break-downs, labor shortage, and a wait for the completion of the excavation. A 1-inch pipe was placed along the bottom of the storage bins for steam heating the aggregates; a water tank was located near the mixer at sufficient elevation for gravity feed and equipped with pipe coils for the circulation of steam for heating; and 1-inch perforated pipe was placed outside the forms at the ground for the discharge of steam. Canvas covers were placed as necessary to confine the heat and moisture during the curing period of ten days. A minimum thermometer was placed in the form and read each morning. Steam for heating the aggregates and water and curing the concrete was supplied by the boiler of a 50-hp threshing engine.

Cold weather was the greatest obstacle on this part of the work. At times it was almost impossible to wash the aggregate and much difficulty was experienced in preventing freezing in the excavations for the footings. However, the concreting was completed in December, and the entire crew placed on the erection of the falsework, cutting timber for which had already started.

### Timber Erection

From December 11, 1942, until January 30, 1943, the contractor's forces were engaged in erecting falsework, stripping the concrete forms and backfilling around piers and pedestals, and erecting a material shed at the south bridge approach. During this period, some of the men were sent to work on the Peace River Bridge and after January 30 the remainder of the bridge crew was sent north for temporary assignment until the arrival of the bridge timber.

The falsework for the 190-foot span rested on four rock-filled cribs 30 feet wide and 20 feet long, placed in the river and spaced to give a 20-foot clear opening. Sills were set adjacent to the concrete piers to support bents so that the tower timbers could be placed in exact position for their full height. At each end of each crib in the river a bent was erected for a height of 30 feet. These bents were 30 feet wide at the bottom sill and the outside posts battered inwards 1 1/4 inches per foot of height. After these bents were cross-braced, a deck of round logs was placed on the caps.

The second lift of bents varied in height to allow for a 1 per cent rise from the south to the north end of the bridge. This last lift was approximately 18 feet in height and a working deck was placed on it. A rigid-frame traveler for placing the top-chord members and diagonals was constructed of logs, supported on log sills which ran between log guides and was large enough to clear the trusses. Falsework for the 114-foot spans was of similar construction, except that the bents rested on sills set along the hillside.

The timber superstructure was fabricated at a plant at North Vancouver, British Columbia. Due to the scarcity of timber, deliveries at the fabricating plant were not started until November 19. Fabricating began in December and continued through January and February, with delivery at Dawson Creek beginning February 25 and continuing through May 14. Work on the bridge was resumed on March 1 and from then to March 18 workmen were engaged in setting dowels on piers 2 and 3 and in completing the travelers for the 190-foot span.

Timber erection began with the placing of the 12 x 12-inch sills for the east tower on March 18. Because only a small crew was on the job at this time and workmen were delayed by a snowstorm, tower construction proper did not start until March 20. The pieces of timber for the towers were lowered into position from the falsework deck by a gin pole equipped with manually operated winches. Erection of the west tower began on March 30 and construction of

both towers was continued on a one-shift basis until April 3, when a night shift was added. Most of the erecting was done by the day shift, while the night shift did the bracing and bolting. During this period there were several snowstorms and the temperature reached 16 degrees below zero. Considerable additional work was necessary in removing snow and ice from bolt holes and grooves for the ring connectors.

At this point it became necessary to prepare for the spring break-up. Most of the bridge crew were assigned to raising the deck of the temporary bridge about 5 feet to provide clearance for the anticipated ice flow. Considerable work was also done in clearing a channel through the river ice. These activities resulted in a shortage of men in the erection crew.

During the first part of April the weather turned warm and water began to flow over the river ice. This flow increased rapidly and during the night of April 11, the water flowed over the deck of the detour bridge. A crew worked all during the night, pushing floating ice

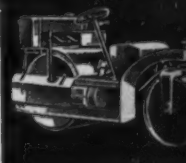
away from the falsework and preventing ice jams at the detour bridge. At 1 o'clock in the morning of April 12, very large blocks of ice floated down the river, carrying away the falsework and the detour bridge. After the loss of five beams of the falsework, the crest of the stream was 4 feet above the tops of the concrete river piers but no damage was done to the timber towers.

Preparations were made to replace the temporary bridge with a pile-bent stream (Concluded on next page)

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Public Roads Administration Photo  
The west timber tower for the Kiskatinaw River Bridge on the Alaska Highway.

## All-Timber Structure On Route to Alaska

(Continued from preceding page)

ture and pile driving began on April 20. Driving the piles into the frozen ground was difficult at first but progressed smoothly after a steam jet was used to thaw the ground and the piles were fitted with steel shoes. This work was carried on for 24 hours a day as the crossing was needed not only for work at this site but also for movement of men, materials and supplies to points along the highway to the north. The temporary bridge was completed on May 1.

While the temporary bridge was under construction, the two towers of the permanent bridge were completed and the east 114-foot truss span was erected. The next major operation was the replacement of the falsework for the main truss span. Piles for a low-level pile-bent trestle were driven and framed bents erected on these. This work was started on May 2 and finished on May 13.

Erection of the 190-foot main span was begun on May 13. Two crews working 11½-hour shifts completed this span and the adjacent truss span to the west and placed the floor beams by May 28. All truss members were erected by a traveler and block and tackle. The four members of the top chord of the 190-foot span are 10 x 24 inches x 48 feet in length and were handled by four sets of tackle and one steel cable operated by a hand winch. The 6 x 16-inch timber stringers were installed on the east and west approach spans during the erection of the 190-foot truss span.

### Crescoted Timber Piling

Each end bent consists of five piles



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which were driven with a double-acting steam hammer mounted in stationary leads. The piles of the east end bent were driven during the period May 14 to 16. The piles were driven to refusal with a penetration of about 20 feet. Piles for the west bent were driven between May 19 and 22. Resistance to penetration was great and all piles were driven to refusal with a penetration of only about 9 feet.

### Laminated Flooring

The flooring of the Kiskatinaw River Bridge consists of laminated 2 x 6-inch native spruce which was given a bath treatment of water-borne salt preservative at the bridge site. Three wooden vats were constructed and used for dipping the lumber. A net retention of ¼ pound per cubic foot was desired and one part of preservative powder was mixed with 3.4 parts of water, using one-barrel (300-pound) batches. Frequent check tests were made to determine the amount of preservative retained. The lumber thus treated was stacked in piles and kept covered with tarpaulins for two

to three weeks before use. Tests made on a few samples with color reagents indicated that the preservative had penetrated the full depth of the 2 x 6-inch lumber. The laying of the laminated flooring was completed on May 31.

The 2 x 12-inch plank wearing surface was laid after the 12 x 14-inch felloe guard was placed, conforming to the curvature of the roadways.

### Quantities and Personnel

The quantities involved in the construction of the Kiskatinaw River Bridge were as follows:

Structure excavation	1,600 cu. yds.
Class B concrete	780 cu. yds.
Reinforcing steel	11,384 lbs.
Treated timber, Douglas fir	336 MBM
Untreated timber, Douglas fir	23 MBM
Treated timber, native spruce	120 MBM
Untreated timber, native spruce	26 MBM
Treated-timber piling	146 lin. ft.
Hardware (bolts and connectors)	87,400 lbs.
Couset and bearing plates	90,400 lbs.

The contract for the Kiskatinaw River Bridge on the Alaska Highway, which was ready for traffic on June 12, 1943, was awarded to Don Construction Ltd. of Toronto, Ontario, Canada. For the

Public Roads Administration, under whose supervision the work was done, R. P. Agnew was Resident Engineer from the beginning of construction activities until March 15 when he was relieved by John B. Kiely, who served as Resident Engineer until the completion of the work.

### Link-Belt Promotions

Edward J. Burnell, formerly Vice President and General Manager of the Pershing Road plant of the Link-Belt Co., Chicago, Ill., has been appointed Vice President in charge of sales of the entire company, to be assisted by Nelson L. Davis, William H. Kinkead, and C. Walter Spalding. Harold L. Hoefman will succeed Mr. Burnell at the Pershing Road Plant, and will in turn be succeeded by Richard B. Holmes as Manager at the Atlanta plant. David E. Davidson, District Engineer at the company's Detroit Office, will become District Manager at Indianapolis, the former position of Mr. Holmes.



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U. S. Army Engineers are building a huge dam in Tennessee. It will require 1,500,000 tons of aggregate—4 sizes of crushed rock: 3"-6", 1½"-3", ¾"-¾", minus ¾"; and one size of sand.

To produce this material, Ralph E. Mills Co., of Roanoke, Va., opened a quarry at the dam site. The rock is a high calcium limestone. TelSmith designed the complete crushing and screening plant, and furnished most of the equipment. Capacity is in excess of 200 tons per hour.

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can turn it out, without taking time out. TelSmith complete sand and gravel and rock crushing plants are a known quantity to miners, contractors and aggregate producers.

That's why TelSmith gets the call on so many war jobs—to build army and navy air bases, dry docks, roads, dams, and other big construction projects.

That's why your Uncle Sam is now taking most of the TelSmith equipment being built. It's going overseas, to build for the armed forces' needs.

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- One 24" x 78' TelSmith Belt Conveyor
- One 24" x 75' TelSmith Belt Conveyor
- One No. 48 TelSmith Gyrophore Secondary Crusher
- One 36" x 121' TelSmith Belt Conveyor
- Two 4' x 12' TelSmith Double Deck Pulator Screens
- Two 16" x 21' TelSmith Belt Conveyors
- Two 4' x 10' TelSmith Single Deck Pulator Screens
- Twelve TelSmith Bin Gates
- Three 18" TelSmith Belt Conveyors
- One 18" x 105' TelSmith Belt Conveyor



### Gardiner of Jaeger Dies

Lion Gardiner, Vice President of Jaeger Machine Co., Columbus, Ohio, and a Vice President of the American Road Builders' Association, died suddenly on November 2, 1943. Jaeger's war work involved his intense activity in manufacturing which, however, never slackened his interest and enthusiasm in the affairs of the A.R.B.A. which he served in committee and other assignments for so long.

Mr. Gardiner was born in Chicago on November 19, 1884, and was graduated from the University of Illinois in 1909.

Since 1918 he has been Vice President and a Director of the Lakewood Engineering Co. and Jaeger Machine Co., both manufacturers of road-building equipment.

### New Le Roi Sales Manager

John M. Dolan recently assumed the duties of General Sales Manager of Le Roi Co., Milwaukee, Wis. Mr. Dolan, who was connected with Sullivan Machinery Co. before his present association with Le Roi, has also served on the Large Compressor Industrial Advisory Committee of the War Production Board.

### Cable and Wire Care

Do's and don'ts in the maintenance of electric cable and wire are treated in a loose-leaf bulletin prepared by the General Electric Co. The three-column pages list common troubles with cable and wire, the corresponding causes, and the remedies, so that any specific difficulty and its treatment may be seen at a glance. The text is supplemented by photographs. Diagrams showing progressive steps in splicing are given at the back of the book, as well as tables of valuable technical data.

Users of electric cable and wire may

secure copies of this bulletin by writing directly to the General Electric Co., Schenectady, N. Y., mentioning this review.

### West Coast Distributor

The Frederick Post Co. of Chicago has announced the appointment of the 20th Century Blueprint Co., 344 Bush St., San Francisco, Calif., as its distributor for that territory, carrying the complete line of Post drafting materials, blueprint paper and other sensitized products. Heretofore such material had to be shipped from the Chicago office.

*That the* **WHEELS OF WAR** *may ROLL FASTER!*

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**THEY DIDN'T GO** "foot slog, slog, slog, slogging over Africa" when Rommel was on the run. The man with the trucks got there "first with the mostest!"

Trucks, planes — all wheeled equipment moves over roads — this is a modern mechanized war and to beat the enemies we have takes the best.

Wherever there is action you'll find a Cedarapids crushing plant pouring out aggregate that the wheels of war may roll faster.

But there is something more than that coming out of the wartime construction and operation of machinery. The performance of a crushing plant under the press of war service can teach valuable lessons for peacetime operation.

Cedarapids owners of the future are going to reap the benefits of the vast wartime experience that Iowa engineers are building up. They are going to reap the benefits of improved design, refinement, smoother operation, higher output and increased economy — benefits that could only come from the watching of a tremendous number of machines under pressure.

Iowa can meet your future plans, whether it is for crushers, bins, screens, asphalt plants, driers or portable or stationary equipment. Now is the time to familiarize yourself with Cedarapids equipment. Come to headquarters.

**IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa**



# An Asphalt-Slag Seal On Cold-Mix Surface

(Continued from page 23)

troit Harvester rotary broom mounted on the front of a truck, requiring at least two trips in each direction to cover the 20-foot base and remove loose material. The contractor applied a prime or tack coat of 0.1 gallon of the cut-back asphalt emulsion per square yard over the entire width of the base with a Littleford 1,050-gallon distributor ahead of the spreading of the cold-mix binder.

A fleet of thirty-five trucks hauling 6 to 7 cubic yards of the binder a distance of 30 miles delivered the material to the Barber-Greene tamping-leveling-finisher, which laid down a uniform strip 10 feet wide and 1 1/4 inches thick. Formerly this was laid down 2 inches thick, but because of the need for spreading the use of asphalt products, as well as the fact that this particular road is not expected to carry high axle loads, the thinner binder course was used. The crew for the laying of the binder course consisted of one man backing trucks into the paver and cleaning truck-bed bottoms, two rakers, and three men carrying back the mix to make up for low spots in the grade.

The spreader was used effectively in laying extra thickness on super-elevated curves and where there were low spots in the grade. The Superintendent watched the wings of the spreader constantly, changing the rate of feed to meet inequalities in the slag-macadam base. The operator of the spreader used a chain guide along stakes set at the side of the road to keep the machine on a true course because the road has many curves. When running the second strip, the edge of the first strip laid was used as the guide.

This crew spread from 400 to 450 tons of material per 10-hour day, equal to about 4,000 feet of 20-foot road. A 7 1/2-ton Buffalo-Springfield tandem roller followed close behind the spreader, compacting the material.

## The Type "O" Seal

The seal for this road used the same asphalt and slag aggregate but with a smaller screen size as follows:

Passing	By Weight
4-inch and retained on No. 4.....	100 per cent
No. 4 and retained on No. 10.....	5-15 per cent
No. 10 and retained on No. 40.....	30-45 per cent
No. 40 and retained on No. 80.....	20-40 per cent
No. 80 and retained on No. 200.....	8-20 per cent
No. 200.....	5-10 per cent
No. 200.....	0-5 per cent

The original specifications called for the application of the seal at the rate of 20, 35, or 60 pounds per square yard, but, under war conditions, on this contract the seal was spread by the Barber-Greene machine at the rate of only 15 pounds per square yard. It was rolled immediately by the 7 1/2-ton roller to a firm even surface.

The final surfacing consisted of hand-casting of slag screening passing a No. 6 sieve in just sufficient quantity to fill the

surface voids. The screenings were spread evenly over the surface by hand brooming, leaving no excess material, and then rolled lightly to key in and set them.

## Miscellaneous Items

The County forces working at the same time on this section salvaged and re-erected the old wood-post wire-rope guard except where it was no longer needed because of the widening and compacting of the berms. The smoothing of the shoulders was done by blading with a Caterpillar No. 12 power grader and then rolling the material as widened by a 10-ton tandem roller.

During the winter of 1942-43 several bad breaks developed in the slag-macadam base due to poor drainage and seeping of water from sidehill springs into the subgrade. These were corrected by County forces who repaired the base, dug several drainage ditches along the sides of the road at weak spots, and laid 6-inch perforated vitrified-clay tile to carry the water away from the subgrade.

## Personnel

The public works of the County of Allegheny are under the direction of the Board of Commissioners: John J. Kane, Chairman; George Rankin, Jr., and John S. Herron. The design, construction and maintenance of all county highways, bridges and tunnels are delegated to the Department of Works, John B. Sweeney, Director; L. B. Duff, Chief Engineer; Charles F. Houlihan, Assistant Chief Engineer in charge of design; S. M. Madancy, Road Design Engineer; S. A. Shubin, Bridge Design Engineer; J. S. Devlin, Assistant Chief Engineer in charge of construction; H. J. Dickman, Construction Engineer, and C. K. Harvey, Office Engineer.

The Trumbull Construction Co. of Pittsburgh, Pa., held the contract for furnishing and laying Type BM binder and Type O seal for 1943 and laid the new surface on Spring Run Road. Kenneth C. Calaway was Superintendent for the contractor on this work.

Back the Attack! Buy War Bonds!

## Silver Anniversary Meeting of A. E. D.

The Associated Equipment Distributors will hold its twenty-fifth annual meeting at the Edgewater Beach Hotel in Chicago, Ill., January 17-20 inclusive.

Nationally prominent speakers are being arranged for by the Program Committee, of which F. B. McBath of Portland, Ore., an A.E.D. Vice President, is Chairman, and paramount problems of the industry, such as the disposition of surplus government-owned construction machinery, contract termination, and tax complexities, will be discussed. The final meeting of the 1943 Board of Directors will be held on Sunday, January 16, and the 1944 Board will meet for the first time on Friday, January 21.

The Associated Equipment Distributors, which will celebrate its silver anniversary in 1944, has grown from a charter membership of a few firms to the present roster of 500 distributors and nearly 150 allied manufacturers, with members in the U.S., Canada and Mexico.



## Rigging... for the bridge of ships

Hundreds of tons, millions of feet, of Bethlehem Wire Rope are being used in rigging cargo ships for American convoys bound to Britain and the Mediterranean and to the Solomons.

Bethlehem Wire Rope is furnished in every size, grade and construction used on both merchant ships and warships. We are

supplying everything from guys and lashings to towing hawsers, elevator cables and hard-running winch ropes. Bethlehem's wire-rope mill is working 168 hours a week to turn out the tremendous quantities of wire rope needed for the bridge of ships, as well as to meet hundreds of pressing war-production needs on the home front.

## USE RIGHT BUCKET FOR THE JOB



Hayward makes all four—clamshell, dragline, electric motor, orange peel. A Hayward recommendation is unprejudiced.



THE HAYWARD CO., 32-34 Day St., New York  
**Hayward Buckets**





## Army Builds Field Of Unusual Design

**Heavy Grading, Big Drainage Structures at an Air-Corps Training Field in the South; Interior Areas Stabilized**

A TRIANGULAR airfield, the location of which provided naturally concealed dispersal areas in the pine-covered countryside, was constructed in 1943 in a southeastern state for use as an Army training field. Located at a higher elevation than most of its surroundings, the project required heavy grading operations and sizable structures in the intelligently planned drainage system.

The field has three runways in the form of an equilateral triangle, properly oriented with the prevailing winds. The runways are 150 feet wide, 5,000 feet long, and consist of 1½ inches of plant-mixed asphaltic concrete on a compacted lime-rock base 6 inches thick. The soil under the runways was stabilized by the addition of lime rock to a California bearing ratio of 70 before construction of the lime-rock base was undertaken. End areas at the points of the triangle, which of course serve as turning areas, and the warm-up aprons and hard standing-areas were paved with plain concrete 8 inches thick on a stabilized subgrade.

Because of the rolling nature of the terrain it was necessary to move approximately 700,000 cubic yards of earth in the construction of the runways. This was done in record time by using a large number of units of various types of earth-moving equipment for two 10-hour shifts daily. The lime rock for stabilizing the subgrade was spread over the graded surface, mixed by spring-tooth and disk harrows, and compacted by sheepsfoot and three-wheel rollers.

When the specified bearing ratio had been obtained, enough additional lime rock was spread so that it would compact to a thickness of 6 inches. The lime rock was pulverized by the passage of tractors, disking and harrowing, then thoroughly wet, and rolled to ultimate compaction while the surface contour and cross-section were constantly maintained by motor patrols.

### Paving Operations

When the base had been properly compacted and dried, it was primed with 0.10 gallon of tar per square yard and covered with 1½ inches of a plant-mix consisting of a pit-run material, 100 per cent of which passed a ¾-inch screen; and from 8 to 11 per cent of 80 to 100-penetration asphalt.

The surfacing was mixed on the reservation in a Barber-Greene continuous mixer with a capacity of 60 tons per hour, hauled in a large fleet of batch trucks of various sizes, spread by a 10-foot Barber-Greene tamping-leveling-finisher, and rolled by 10-ton tandem rollers.

Perimeter taxiways aggregating over 18,000 linear feet were constructed and also furnish access to the hard standing-areas which are dispersed and concealed in the surrounding pine groves. Taxiways 50 feet wide were constructed of a two-course surface treatment on top of a lime-rock base. The base was prepared in the same manner as that for the runways. It was primed with 0.2

gallon of tar, and 55 pounds of ¾-inch to No. 4 slag was applied to the surface by Buckeye spreader boxes and shot with 0.35 gallon of 80 to 100-penetration asphalt per square yard. After this course had been rolled by 5-ton tandem rollers, a second course consisting of 0.25 gallon of asphalt and 30 pounds of ¾-inch to No. 4 slag per square yard was applied and rolled in the same manner. A 600-gallon Littleford distributor with a 20-foot spray bar was used for the application of the asphalt.

Concrete for the warm-up aprons and standing-areas was mixed by Rex pavers fed by a fleet of trucks from a proportioning plant located on the reservation.

### Drainage System

Because the sandy surface soil at this location is underlain with a strata of stiff retentive clay which interferes with normal subsurface drainage, it was necessary to install a considerable quantity of 6, 8 and 10-inch vitrified-clay sewer pipe laid with open tar-paper-covered joints in ditches filled with ¾ to 2½-

inch gravel. This subsurface drainage system discharges directly into the storm-water system and has effectively dried up areas which had proved troublesome before the installation was made.

The field is located in an area of heavy rainfall and the rolling terrain and the considerable areas involved complicated the design of the storm-water system. After careful study by the Area Engineer, it was decided to arrange the grades that surface water could be discharged, through drop inlets, into three separate systems having different outlets and each handling approximately one third of the total surface drainage. By so designing the systems it was possible to utilize available commercial sizes of reinforced concrete pipe, thereby reducing the cost, and what was of even more importance during the emergency wartime construction program, greatly expediting the early completion of the project. The three main outfall lines consist of a

(Concluded on page 52)

# WAR

**has proved again...**

**No other existing equipment can prepare subgrade as quickly, cheaply and accurately as a Buckeye R-B Power Finegrader.**



IT is significant that on a big percentage of road and airport runway jobs during this war period, when speed and good work were paramount, that Buckeye R-B Power Finegraders were put to work ahead of the pavers. At the record-breaking Willow Run bomber plant job, four complete paving outfits, each with an R-B Finegrader were used. On military access roads, offshore bases, black top and concrete air bases and many others . . . R-B Finegraders paced operations. In prewar road construction, 19 of the contractors on The Pennsylvania Turnpike used R-B's. On post-war work, contractors who have reviewed these records will make Buckeye R-B Power Finegraders an integral part of their paving outfits. Send for descriptive literature now while the subject is fresh in your mind.

**BUCKEYE TRACTION DITCHER CO.**  
Findlay, Ohio



# Buckeye

Tractor Equipment Trenchers  
Road Wideners Spreaders  
Power Finegraders Convertible Shovels

## HOISTS

**STEAM • ELECTRIC  
GASOLINE • DIESEL  
AND  
BELT DRIVEN**

- FOR OVER 69 YEARS WE HAVE BEEN BUILDING FINE HOISTING MACHINERY
- OUR DUPLICATE PART SYSTEM INSURES PROPER FIT OF OUR FACTORY BUILT REPLACEMENTS
- FOR THE DEFENSE AND OFFENSE WAR EFFORT KEEP YOUR PRESENT HOIST IN GOOD WORKING CONDITION

*We can help you!*

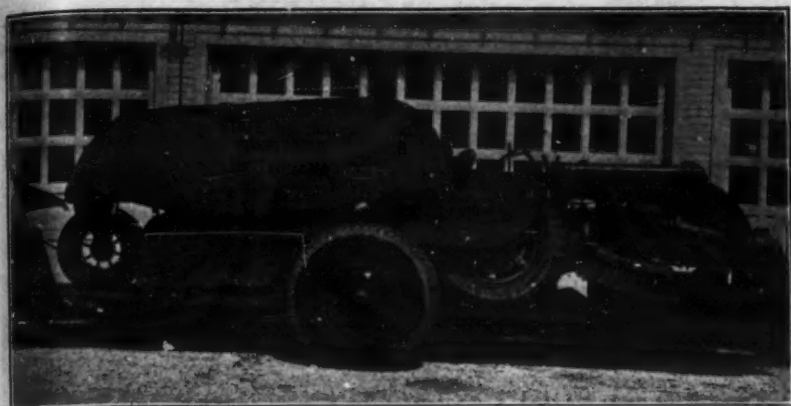


*We proudly fly these flags*



**LIBERTY**  
MANUFACTURING COMPANY  
Main Office and Works ELIZABETH, NEW JERSEY





Although street sweeping is not a usual activity of state highway departments, Indiana owns ten motor sweepers for use on city streets in the state highway system. The trailers provide speedy transportation from city to city.

## State Highway Dept. Cleans City Streets

The maintenance of city streets on the state and Federal highway systems in Indiana is the responsibility of the Maintenance Division of the State Highway Commission of Indiana, S. C. Hadden, Chairman. This includes patching, resurfacing and even street sweeping. Prior to 1937 this work was done only in cities up to 3,500 population, but the State Legislature in that year extended this work as a State Highway Department service to all cities in the state, except Indianapolis.

When the program was widened so greatly by legislative enactment, it was necessary to create new or revise patrols in the 79 cities added to the state highway system. Further, to care for the cleaning of streets, ten additional power street sweepers were purchased. At first sweepers of all available makes small enough to be moved readily by motor transport were purchased on trial and distributed one or two in each of the six highway districts. A total of 433 miles of city streets is now swept by state-owned sweepers and some rented from cities owning them. The ten Austin-Western and Hough motor pick-up sweepers now in service are moved quickly from city to city by small two-wheel home-made trailers.

It was necessary to resurface a considerable mileage of the city streets taken over for state maintenance because the rough uneven surfaces were in a failing condition and could not be swept economically by any method, hand or mechanical. The work of the power machines was markedly improved by opera-

tion on the smoother resurfaced city streets.

The Maintenance Division of the State Highway Commission of Indiana is under the direction of Norman F. Schafer, Superintendent of Maintenance.

## Sand, Gravel Washers For Clean Aggregate

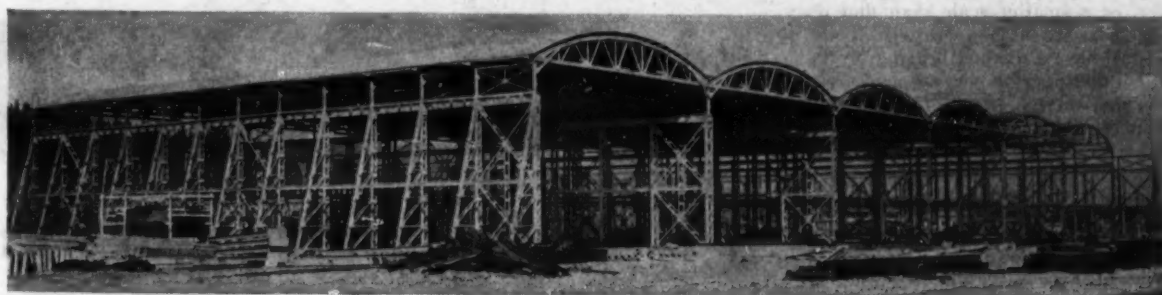
The post-war construction program will include a large amount of concrete work for airport runways, highways, bridges, dams, and other needed public works. Many highway and commercial specifications now require the use of washed aggregate for concrete. A new 28-page booklet recently issued by the Eagle Iron Works, Des Moines, Iowa, points out that the line of Eagle spiral-screw sand and gravel washers is designed to provide entirely clean aggregate which will meet such requirements.

Both gravel and sand washers made by Eagle operate on the same principle, removing foreign material from the aggregate by means of an upward current of water from the bottom inlets throughout the entire bed of material as it is conveyed up to the material discharge end, thus taking advantage of the difference in the specific gravities of foreign material and the aggregate. At the same time the material is subjected to an

abrading action both by the screw and paddles, the pieces rubbing against each other to give the aggregate a severe scrubbing. When the aggregate reaches the upper end of the inclined tub, the dewatering is complete. The water is introduced through the bottom inlets of Eagle washers by means of an exclusive process, consisting of a multiplicity of small holes extending the washing length of the tub and decreasing in size toward the upper end.

The Eagle line of washers includes single-screw and double-screw gravel washers, an auxiliary shale remover, single and double-screw sand washers, dewaterers, classifiers, portable stockpile rewashers, and special sand and gravel washing equipment. Copies of bulletin No. 41, describing and illustrating these various units and models, may be secured by interested contractors and state and county highway engineers direct from the manufacturer by mentioning this magazine.

Get your scrap metal into the scrap!



THE MARITIME COMMISSION found wood a highly satisfactory construction material in its shipyard program. This huge assembly building at a record-breaking Liberty yard is 240'x860' and contains 143 trusses prefabricated and erected by Timber Structures, Inc.

## MATERIALS ARE IMPORTANT. ...BUILD WITH TIMBER STRUCTURES

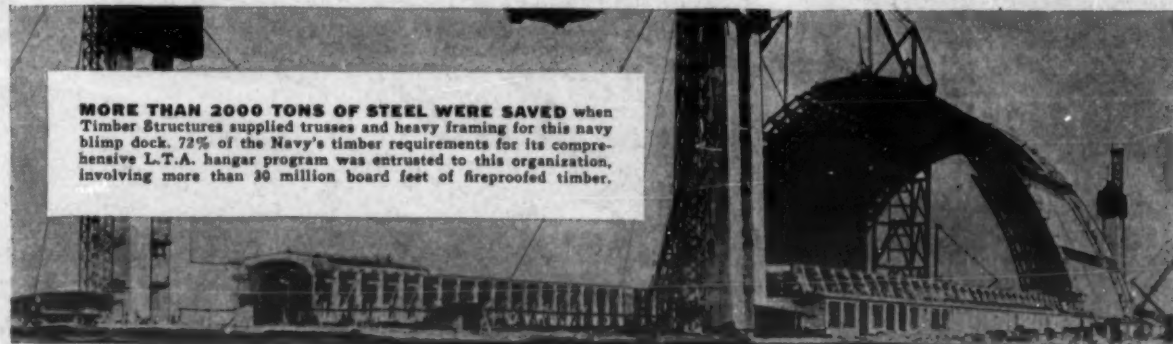
THE WAR has spotlighted the virtues of wood in heavy construction. Shortages in other structural materials have served to emphasize what many engineers and architects already know—that wood, properly designed and prefabricated, is often a sensible answer to construction requirements.

Fulfilling these requirements for timber trusses and heavy framing has been Timber Structures job for years. The virtues of wood—strength, economy, speed in erection, permanence, ready source of supply—have been brought together through the engineering know-how of this organization.

We welcome inquiries on the use of wood or other structural materials for your construction projects. Write to the nearest Timber Structures office for illustrated book on the work we have done, are doing.



ORIGINALLY DESIGNED FOR STEEL by the U.S. Army Engineers, this ordnance repair shop was redesigned by Timber Structures engineers for wood. For this building (60'x220') 28 trusses, columns and bracing were prefabricated and erected. Approximately 30,000 bd. ft. of lumber was used in the building.



MORE THAN 2000 TONS OF STEEL WERE SAVED when Timber Structures supplied trusses and heavy framing for this navy blimp dock. 72% of the Navy's timber requirements for its comprehensive L.T.A. hangar program was entrusted to this organization, involving more than 30 million board feet of fireproofed timber.

**TIMBER  
STRUCTURES**  
INCORPORATED  
Portland 8, Oregon New York 17, N. Y.

*Engineering in Wood*

**TIMBER STRUCTURES, Inc.**  
Send Book "Engineering in Wood"

Name \_\_\_\_\_  
Address \_\_\_\_\_

Type of building or business \_\_\_\_\_

If west of the Mississippi, send to Portland 8, Oregon. If east of the Mississippi, send to 535 Fifth Avenue, New York 17, N. Y.

**BAILY  
CONCRETE  
VIBRATORS**



## PAVEMENT VIBRATORS

Three types: Vibrating screed, full-width, propelled by hand-operated winch and cable or pushed ahead by finishing machine. Gasoline power plant.

Tubular internal, extending entirely across slab, mounted in front of finisher. Gasoline or electric power plant with flexible shaft drive. Vibrating pan, full-width, carried by two-wheeled trailer behind any standard finisher. Gasoline or electric power plant.

**STRUCTURAL CONCRETE VIBRATORS**  
1, 3, and 4 H.P. gasoline, air-cooled, 4 cycle motors; flexible-shaft drive; interchangeable vibrator heads lubricated for life. Wheelbarrow carriers.

Pioneers in Concrete Vibrators

**BAILY  
VIBRATOR CO.**  
2534 WOOD STREET, PHILADELPHIA PA



## Georgia Makes Plans For Post-War Roads

(Continued from page 26)

that is to be worked out from the surveys described will be for a definite highway-construction plan, which will provide the means for setting up yearly construction budgets for any number of years that future financing arrangements make possible.

### Need for Caution

A feature of the survey that bespeaks the thought which has gone into its conception is the consideration being given to the new and enlarged plants that are now operating on war work in the state. They are being consulted as to their plans for the post-war years, particularly whether they expect to continue to operate as producers of munitions on a reduced scale, or whether they plan to convert to civilian products on the same, a larger, or a smaller scale than that on which they are now operating. These things all have a distinct bearing on the need for the development of new areas by the construction of state or secondary or county roads, and indicate also the possible shifts in population which will affect the desirable location of a highway under consideration as a post-war project.

Lastly, no present work is being done on the possibility that there may be super-highways or toll roads in or through Georgia. The future of this type of highway, it is felt, depends on the report now being prepared by the Public Roads Administration at the direction of Congress.

### Autos and Highways Haul Most Workers

Surveys made by State Highway Advisory Committees to the War Department, in Alabama, Colorado, Indiana, Illinois, Kansas, Ohio, Oregon, Utah, Vermont and West Virginia, show that the family automobile is still the most frequently used mode of transportation for war workers. A summary released by the Automobile Manufacturers Association shows that, of 140,000 persons surveyed at 94 war plants in 10 states, as of August through October, 1942,

73.1 per cent traveled by automobile, 13.2 per cent by bus, 2.4 per cent by some other means of mass transportation, 10.3 per cent walked, and all other modes were covered by the final 1.0 per cent.

The figure was not as high in a June, 1943, survey of 645 plants when 317,765 persons were questioned in Chicago. That survey shows 33.8 per cent traveling by auto and 10 per cent walking, with no figures for the other methods of transportation. In the Chicago suburbs in the same month, 102,977 persons working in 155 plants showed 45.5 per cent relying on automobile transportation and 20.0 per cent walked.

The highest per cent using autos is reported in Providence, R. I., where 78.6 per cent of 34,775 workers interrogated in July, 1942, used autos, 10.2 per cent, bus or other mass transport, 10.9 per cent walked, and 0.3 per cent traveled by some other means.

A very careful and extensive survey of 749 war plants in Michigan by the State Highway Department showed 75

per cent of the workers using automobiles to reach their jobs. This survey also showed that as the size of the city decreased, the per cent of workers de-

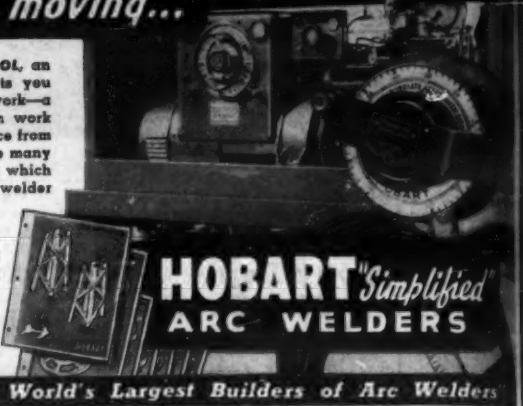
pending on automobiles for transportation increased. For example, in Detroit the per cent was 61, while in the area outside of Detroit it was 89 per cent.

## HOBART Arc Welding keeps the job moving...

● "SIMPLIFIED" REMOTE CONTROL, an exclusive Hobart feature, lets you control heat right at your work—a real help on all construction work where operator is at a distance from welder. This is just one of the many Hobart exclusive features which makes it the most efficient welder available today.

● DESIGN PROBLEMS can be solved through the help of these sheets. Initial pages FREE. Write for them today.

HOBART BROTHERS CO.  
BOX CE-122, TROY, OHIO



"One of the World's Largest Builders of Arc Welders"

## Air where you want it... until the job is done!

IT means something for an air compressor to give you air where you want it—from the time the compressor is put on the job until its job is finished. For this reason, a SCHRAMM Air Compressor was selected by a State Highway Department to operate breakers, rock drills, clay spades, and other tools for emergency repairs on an important national highway.

In SCHRAMM, both compressor and engine are coupled into a single, rigid, permanently aligned unit by means of a sturdy clutch housing which maintains alignment under the severest conditions. Both engine and compressor are watercooled, and there's forced feed lubrication for longer wear, push-button for easy starting. And since modern engines are used for operating speeds 50% higher than formerly, Schramm compressors are designed to match these new speeds, assuring maximum torque and maximum horsepower per gallon of fuel. This is made possible by the use of mechanical intake valves operating from a camshaft in perfect timing with the crankshaft, and piston travel similar to the best automotive design.

For full details, write today for Catalog 42-PA.



# SCHRAMM INC.

THE COMPRESSOR PEOPLE  
WEST CHESTER  
PENNSYLVANIA

## USE TARPAULINS

Order Now!  
QUICK SERVICE  
NO PRIORITIES  
NEEDED

Speed construction. Protect vital materials in all sorts of weather. FULTON TARPAULINS will give you maximum satisfaction. Contractors Supply Dealers in every state sell the FULTON line. Specify SHUREDRY and FULTEX. FULTON products are good and prices are right. If your dealer can't supply you, write our nearest plant for catalog, samples and prices.

Fulton Bag & Cotton Mills

Manufacturers Since 1820  
ATLANTA ST. LOUIS DALLAS  
MINNEAPOLIS NEW YORK NEW ORLEANS KANSAS CITY KEN



## TOOLS ARE WEAPONS

...treat 'em right!



PUT THEM AWAY!



HANDLE WITH CARE

## Applying Bituminous Materials to Roads

Fast loading and heating, accurate application, and a minimum cost of operation and upkeep are some of the features claimed for Brokol bituminous distributors by the Brokol Mfg. Co., 94 Madison St., Newark, N. J. These units are of sturdy construction, with all parts of the equipment readily accessible.

Fast heating is accomplished by means of two sets of 8-inch flues providing an extra-large heating surface and allowing the installation of two high-capacity burners. The 4-inch Viking asphalt pump is located behind the driver's cab where it is fully protected from clogging fumes and flying particles. The 30-hp Continental engine is mounted on a telescoping base and can be removed from its protected position by one man in a minute for repair or adjustment. An automatic suck-back system prevents drip and provides the self-cleaning feature of the spray bars, which raise and fold up for transit. Apart from the usual operations, the Brokol distributor can be used for loading auxiliary equipment from tank or truck or a booster.

These units are available with tanks of 500 to 2,000-gallons capacity, for truck or trailer mounting, or in larger sizes for semi-trailer mounting. The spray bar is furnished for a 25-foot spread, with one double 4-foot center bar, and eight 2-foot and one 1-foot extension bars. The spray-bar shifting device permits moving the bars a distance of 18 inches, 9 inches to either side, while the raising device lifts the spray equipment 20 inches off the ground and folds the bars up for transit.

Complete details on these Brokol distributors are contained in Bulletin N-41-1, copies of which may be secured direct from the manufacturer.

## War Assembly Line

Is 125 Miles Long

It is generally accepted that our highways are doing their part far behind the front lines, to serve the needs of distant fighting. Few have realized, however, how exceedingly important the highway links have been to manufacturers and subcontractors in closing the gaps in their assembly lines.

One automotive prime contractor in Michigan extended his assembly line 125 miles to include facilities of four subcontractors in three towns. At a foundry in Town A, a truck picks up 20,000 small iron castings, hauls them to an annealing plant in the same town; then, loaded with 20,000 annealed pieces, drives 55 miles to Town B, where the parts are machined.

After unloading, the truck takes on 20,000 machined units for a 30-mile trip to Town C, where the parts are cadmium-plated. Picking up a load of 20,000 finished pieces, the truck returns 40 miles to Town A where the prime contractor assembles the parts in shells.

## Joe Helm to Retire

From Asphalt Sales

Joseph S. Helm, for many years Manager of the Asphalt Sales Department of the Standard Oil Co. of New Jersey, and now on leave of absence, will retire from active duty in April of next year, after thirty-four years of service, to make his home at Delray Beach, Fla. Mr. Helm was one of the original organizers of The Asphalt Association, now The Asphalt Institute, in 1918 and has been a Director since its organization and at one time its President. This has been a period of remarkable growth in the asphalt industry, its annual sales in the twenty-five years from 1918 to 1943 increasing steadily from about 1,500,000 tons to 8,000,000 tons, or more than 500 per cent.

## Symposium on Paint

Seven of the eight papers comprising the Symposium on Paint held at the 1943 spring meeting of the American So-

ciety for Testing Materials have been reprinted in a 65-page pamphlet entitled "Symposium on Paint". A portion of the symposium devoted to wartime practices has an extensive paper on protective concealment paints, while others cover drying oil and fatty acid development, sur-

face coating of opaque pigments, surface coating of calcium carbonate extenders, and emulsion paints.

Copies of this publication may be obtained from A.S.T.M. Headquarters, 260 So. Broad St., Philadelphia 2, Penna. Price: \$1.00 a copy.

## AMERICAN WHEELBARROWS

With Steel Wheel  
for WAR ORDERS

Barrow shown is the American No. 1—4 cu. ft. struck capacity DeLuxe Concrete Wheelbarrow available with steel wheel.

Code with steel wheel.....  
.....PERFECT-S

Write  
for  
Bulletin

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

**POSITIVE CONTROL  
BOOM OPERATION**

**Boom Raising and Load Hoisting While Swinging**

On war project construction or in the combat areas, Koehring Cranes are saving valuable seconds. Production counts today more than ever. Peak production is maintained on construction jobs where Koehring Cranes operate. With positive control every move is a faster move... every move is a production move. If you have a Koehring Crane, keep it in good operating condition until they are again available for post-war construction. All present operating features plus many improvements will again give you peak production at minimum operating costs.

**KOEHRING COMPANY**  
Milwaukee, Wisconsin

**DEPEND ON YOUR KOEHRING DISTRIBUTOR**  
to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

**HEAVY-DUTY CONSTRUCTION EQUIPMENT**





C. &amp; E. M. Photo

For a light-penetration surface treatment on U. S. 31 in Alabama, coarse slag is spread on the tar binder by a St. Paul spreader box.

## New Pre-Mix Surface For Alabama Highways

(Continued from page 38)

and a pneumatic-tire roller.

SCREEN SPECIFICATION OF NO. 5B SLAG			
Passing 1-inch sieve	100	per cent	
" 3/4-inch "	70 to 100	" "	
" 3/8-inch "	0 to 10	" "	
" No. 4 "	0 to 3	" "	

This surface treatment will later be topped with 60 pounds of pre-mix seal by state maintenance forces after applying a tack coat of 0.12 gallon of RC-2 per square yard.

### Pre-Mix Seal

The plant-mix or pre-mix seal project S-256-A was located between Wagarville and Chatom on U. S. 84. The outfit working here has placed hundreds of miles of this type of seal so that its work is typical not only of the operations this current season but also of the work that has been going on in Alabama for some time. Before the seal was placed on the single surface treatment, it was shot with a tack coat of 0.08 gallon per square yard, using RC-2. This is a very light tack, about as light as can be shot and have it visible when looking both ways on the roadway. For this 9.6-mile job the seal was laid 10 feet wide by an Adnun Black Top Paver supplied by a fleet of trucks with a dead haul of 5

miles and an average haul of another 5 miles on the project. At the paver two men worked to clean the trucks, the paver operator kept the machine in line, the foreman ran the screed and controlled the rate of laying, there were two rakers, and two men carrying back to the rakers when necessary. Two laborers greased the rolls of the Adnun and watered the roller. A Galion 7-ton tandem roller was used for compacting the seal. This outfit with a running time of 11 hours lays regularly 1 mile of road full width with the 60-pound seal.

Additional field equipment, aside from the plant, included a 900-gallon tank truck for hauling water for the roller and paver from a nearby brook, where the water was pumped by a Jaeger Sure-Prime pump.

The plant serving this outfit was a Cedarapids plant using a larger drier than the standard for the plant. It was set up in a gravel pit providing a satisfactory gradation of aggregate but with a fairly large amount of oversize.

(Concluded on next page)

## For speedy heating of tar and asphalt—

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Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

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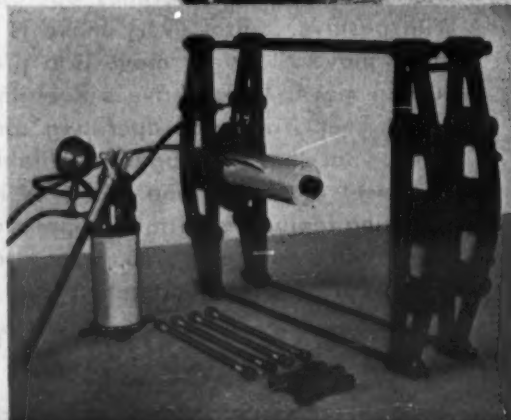
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Rodgers Universal Hydraulic Presses have been purchased by many large industrial shops equipped with large stationary presses. Plant engineers and foremen recognize the advantage of having a powerful portable hydraulic press to take to the repair job, and the convenience of doing many press jobs in the Universal Press which are difficult to handle in a large stationary press.

Contractors and service repair shops alike will find it both convenient and profitable to use the Universal Press Equipment wherever they have heavy machinery to repair or overhaul. The Universal Press will save you both time and expense. *If it's a Rodgers, it's the best in Hydraulics.* Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minnesota.



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Send for Bulletin CE-45

**ALLIED STEEL PRODUCTS, Inc.**  
N.B.C. BLDG. - CLEVELAND 14, OHIO, U.S.A.



# State-Owned Plant For Alabama Pre-Mix

(Continued from preceding page)

JOB MIX FORMULA FOR PLANT-MIX SEAL

1/2-inch square-mesh sieve.....	100 per cent
3/4-inch " " " " " " " " " " " "	90 " "
No. 4 " " " " " " " " " " " "	60 " "
No. 10 " " " " " " " " " " " "	52 " "
No. 20 " " " " " " " " " " " "	18 " "
No. 40 " " " " " " " " " " " "	2 " "
No. 80 " " " " " " " " " " " "	1 " "
AC, 80 to 100-penetration.....	5.7 " "

The material was fed to a stockpile behind a bulkhead by a Caterpillar RD7 with a LeTourneau bulldozer. The cold elevator picked up the material as fed through a gate by two men and delivered it to an oil-fired drier measuring about 10 feet long x 5 feet diameter. The discharge from the drier was run down a chute to the hot elevator of the plant and lifted to the vibrating screens at the top of the plant. The batches were weighed out in 1,000-pound units by the mixer man, who also weighed the asphalt, controlled the mixer, and dumped the batches onto a belt conveyor that delivered them to the waiting truck.

Auxiliary equipment for the plant includes an Allis-Chalmers power unit with belt drive for the drier and cold elevator, another with an extended shaft and V-belts for the Cedarapids mixer and the hot elevator. Asphalt storage is provided by a 10,000-gallon tank with steam heat, from which the asphalt flows by gravity to the 500-gallon booster tank and is heated from 300 to 325 degrees by an oil torch. A small gas-engine-driven air compressor provides air for the truck tires and for the fuel tank on the booster heater. A 1,000-gallon water tank provides storage for water for the 50-hp vertical boiler which provides steam for heating the large asphalt-storage tank and for the rotary asphalt pump which mills the asphalt from the gravity-fed booster tank and delivers it to the loop from which the asphalt is drawn for the weigh box, any excess running directly back to the large storage tank. The reciprocating fuel-oil pump is also steam-driven. The fuel-oil storage tank has a capacity of 10,000 gallons. Both large storage tanks are Birtanks made by the Birmingham Tank Co.

A 500-gallon home-made transfer tank truck hauls asphalt 4 miles from the siding, loading by its own pump and delivering to the asphalt-storage tank. At the siding a 50-hp vertical steam boiler provides steam for heating the tank cars of AC-8 asphalt.

The operating crew at the plant includes: two men controlling the aggregate at the cold elevator and one man at the top, one man for the drier torches, one mixer man, one man on the loading belt, one man at the booster tank, one fireman for the steam boiler, one laborer, one mechanic, and the Foreman. This plant and crew produce 400 tons of plant-mix seal in 10 hours operating time, with a maximum of 450 tons.

## Personnel

Surface-treatment operations in Alabama are in charge of George W. Phillips, Chief Engineer of Construction and Maintenance, with A. P. Villadsen, Division Engineer, Sixth Division, directing the field operations described. G. R. Swift is State Highway Director.

## Portable Generators For Power on the Job

Illumination for night construction activities, for construction camps, or for emergency road or bridge repair, and power for saws, drills, sanders, sharpeners and other electric tools are provided by Epcor portable generators which are available in three popular-size models, the 750-watt B-7, the 1,500-watt B-15, and the 3,000-watt B-30. Equipped with Briggs & Stratton air-cooled gaso-

line-driven engines, these generators provide 110-volt 60-cycle alternating current for all standard electrical equipment and tools.

Of light-weight, compact and sturdy construction, the B-30 weighs 305 pounds, while the B-15 weighs 225 pounds. Both have direct current winding on the armature for excitation of the field windings, a four-pole arrangement of special design to provide a good sine wave, and a dynamically balanced armature, driven by a V-belt to make the maximum horsepower of the engine available for generating purposes. The forty-nine-bar large mica insulated commutator is located near the end, with its cover easily removable for access to the brushes. The V-belt drive permits easy uncoupling of the generator and engine, resulting in greater portability. The engine may be used separately for other purposes, such as a pump or other motorless tools, when there is no need for the generator.

A new folder, containing complete specifications on these Epcor portable generators, may be secured by contrac-

tors and state and county highway engineers direct from Electrical Products Consolidated, 1000-1020 Virginia St., Seattle 11, Wash. Just mention this item.

Laucks News reports that over 5,000,000 tons of metal have been saved in 1943 through the use of wood-and-glue construction.

## DEPENDABLE, STURDY!

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Stationary type gasoline engine driven welders are complete as shown, ready for mounting on skids or your own portable chassis. Include heavy-gauge sheet metal housing, roomy storage cabinet that locks. Engines are equipped with battery ignition, battery, starting motor, charging generator. Automatic "slow down" brings engine up to speed when arc is struck, causes drop to idling speed when welding ceases.

UNIVERSAL POWER CORP.

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Gasoline-driven 300 ampere, and electric and motor-driven 200, 300 and 400 ampere welders available for 2-week delivery. Contain several features not found in more expensive welders. Send coupon for complete story.

Universal Power Corp., 4897 Euclid Ave. Cleveland 3, Ohio

Send story on gas-driven arc welders.

NAME

ADDRESS

CITY

STATE

## HOW ABOUT Availability OF CLEVELAND ROCK DRILLS?



Of course, you are well acquainted with the excellent performance and durability of Cleveland Rock Drills. Our purpose here is to inform you of the prompt delivery we can make on this equipment.

MODEL H111—Leader in the 55-pound class for soft, medium, or hard rock. With AA-1 priority, shipment will be made within a week of receipt of order.



MODEL H10—The favorite in the 45-pound class. Despite the popularity of this drill, we are still in position to accept orders carrying AA-1 priority.

MODEL H66—The light drill with the big wallop. With AA-1 priority, we can ship reasonable numbers of this good machine within a week of receipt of order.

Rock drill users, that's the situation on Cleveland hand-held drills. On spare parts we make immediate shipment. Be assured that your requirements will always have our best attention.

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Division of The Cleveland Pneumatic Tool Company

CABLE ADDRESS: "ROCKDRILL"

CLEVELAND 5, OHIO

LEADERS IN DRILLING EQUIPMENT



## Triangular Airfield Completed in South

(Continued from page 46)

quadruple line of 30-inch pipe; a triple line of 42-inch pipe; and a double line of 48-inch pipe. Each main outfall line is fed by collecting systems of 18, 24, and 30-inch pipes.

### Stabilization of Interior Area

After construction under the original plan had progressed well toward completion, it was decided by the Army that the area inside the triangle formed by the three runways should be graded to a uniform contour and stabilized to a California bearing ratio of 40. This required additional grading of nearly 300,000 cubic yards and some extension of the subdrainage and storm-sewer systems. It resulted, however, in the creation of an all-over landing field, having a very considerable landing area of sufficient stability for everything but the heaviest planes and adding greatly to the training value of the installation.

The interior area was stabilized, as had been the areas under the runways, by spreading lime rock to a depth of approximately 4 inches, plowing, disking and harrowing in two directions at an angle of 90 degrees, blading and rolling.

All the interior area was sprigged with Bermuda grass and although considerable doubt was expressed that the grass would grow on the lime-rock-stabilized surface it was taking hold nicely at the time of our visit to this field and showed promise of good coverage before the end of the next growing season.

A cantonment area, with appurtenant buildings, sufficient to house four squadrons was constructed at this field. The buildings were cleverly dispersed throughout the surrounding pine groves, which not only added to the safety of the forces stationed there but contributed materially to their comfort.

### Personnel

For reasons of military security it is considered inadvisable to disclose the location, the name of the contractor, or the Engineer Corps officers responsible for the construction of this project.

## New Honduran Roads Of National Benefit

New highway construction carried on through Inter-American cooperation in Honduras during the past 12 months is helping the development of abaca and other strategic war materials and giving new vigor to the economic life of the regions opened by the roads. The major highway construction has been on the Inter-American Highway route, on which contractors employed by the U. S. Army Corps of Engineers have completed construction of 70 miles of all-weather road, and on an important segment of a transverse highway between Potrerillos and Pito Solo, over which products are transported from coast to coast.

Construction of the 50-mile Potrerillos-Pito Solo road was undertaken a year ago by the Institute of Inter-American Affairs, an agency of the Office of the Coordinator of Inter-American Affairs. The road project provides employment for 1,800 displaced banana workers and aids production and transport of strategic materials. Some 43 miles of the road have been cleared, 32 miles graded, and 14 miles surfaced with crushed rock.

Highway construction is important in Honduras where Tegucigalpa, alone among Central American capitals, is without railroad connections. A transition is taking place on the north coast of Honduras from a one-crop banana economy to the production of abaca, wild rubber, castor beans, mahogany and

citronella. Furthermore, road construction has stimulated agricultural production by making the markets of Tegucigalpa and other cities more accessible.

Between Potrerillos and Rio Lindo, 16 miles south, automobile travel time has been cut from 2 1/4 hours to 45 minutes.

The trip is now made in high gear instead of low. Another benefit from this modern highway is less wear on tires. On the old road tires used to become useless after 1,200 miles of travel.

A striking example of local benefits of highway construction is seen at Potreril-

los. Already the tax revenues of that have more than doubled and many buildings have been erected.

Bridges on the Potrerillos-Pito Solo highway have been built of stone, instead of concrete because of the shortage of reinforcing steel, with wood floors.



# MARTIN TRAILER

—4 models—  
7, 10, 15 & 20-ton  
capacities

Don't say, "We want a TRAILER." Say: "We want a MARTIN Trailer."—This will insure your getting a trailer that's EASY LOADING, POWERFUL, FAST, SAFE, LONG-WEARING and ECONOMICAL. . . .

Sold by all Caterpillar Distributors.

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## Martin Machine Company, Kewanee, Ill.



## The Navy knows the Answers

In our Navy, the world's most formidable fighting machine, Diesel-powered craft of all kinds are lubricated with Standard of California's RPM DELO. The answers in this naval quiz tell you why. They'll solve your problems on how to squeeze more efficiency out of your Diesels—and cut maintenance costs.

### Q. Can a submarine drown in air?

**A.** Yes. Her Diesels "breathe in" great quantities of air which cause ordinary oils to turn gummy, stick rings and hasten engine failure. In today's subs, RPM DELO eliminates this ring-sticking, reduces sludge and deposits—greatly increases cruising range.



### Q. How do you put a bone in the teeth of a DE?



**A.** Powerful Diesels put that speed wave under the bow of a Destroyer Escort. With RPM DELO lubricating her big engines and keeping them at top efficiency, a Destroyer Escort can sprint like a race-horse, even at the end of a long convoy trip.

### Q. What is the most explosive part of a minesweeper?

**A.** Her engine. Thousands of times a minute, fierce explosions sear her cylinders. But they're safe with RPM DELO because it contains special additives that make it cling to hot spots, give constant point-of-wear protection, even under most severe conditions.



### Q. What is the most important duty of a landing barge?



**A.** To keep in action—because a beachhead breakdown could be disastrous. RPM DELO in a landing boat's Diesel gives it extra protection against breakdowns. RPM DELO often cuts Diesel repair bills in half, doubles the time between overhauls, minimizes wear.



RPM DELO is marketed under the following names: RPM DELO • Coltex RPM DELO  
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## STANDARD OIL COMPANY OF CALIFORNIA

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity



# Telling the Public All It Wants to Know

State Highway Departments  
Must Analyze Their Public,  
Have Something to Tell and  
Dramatize the Telling

By THEODORE REED KENDALL,  
Editor

WITH plans now under way for large programs of construction immediately following the end of World War II, each state highway department is anxious to establish the best possible relations with the public, and thus insure the carrying out of those programs, by telling the public what it wants to know about the work of the department and its prospective construction program.

## What Is Your Public?

Generally speaking, your public is made up of the people who use your highways. But actually, telling the public is not as simple as that statement would imply, for this large general public is divided up into groups or organizations, each with its own special interests in the highway transportation system. There are the automobile owners; trucking organizations and their individual truckmen; tourists, both from within your own state and those extremely valuable visiting tourists; civic and business organizations; competing transportation services, such as the railroads and airlines; and finally the politicians, both in and out of office. Each of these groups looks upon the work of the highway department in a slightly different manner and therefore information about the activities of the highway department must be presented to them in a somewhat different form.

However, basically, your public wants and needs to know four things: (1) what the highway department is doing to justify its existence; (2) how and why it is doing it; (3) where the money comes from to finance the work; (4) is that money being spent wisely or, in other words, is the public getting its money's worth?

A well-designed well-maintained efficient highway system is of course your best type of propaganda, but it is not

enough. Information on the activities of the highway department, answering these four questions, must be disseminated to the public and must be keyed to the interests of the various groups making up that public.

Taxpayers, who are becoming more and more interested in where their money goes, as Federal taxes and expenditures rise to new astronomical figures, want to know who is going to pay for this proposed construction program. There is, even among generally well-informed people, a surprising and sometimes appalling ignorance about our highways and how they are financed. Some gain against this lack of knowledge has been made in the campaigns against gas-tax diversion, but much more needs to be done. This type of information

comes best from the state highway departments themselves, tied in with specific programs and projects so that the public can see the relation between expenditures and the completed improvement.

The trucking companies are also interested in the expenditure of gas-tax money, but since the type of highway, grades, safety, and distances between cities affect their pocketbooks more closely, they want to know not only how their money is being spent but how this expenditure will save them mileage, wear and tear on the trucks, and increase safe travel.

Tourists within your own state belong usually to one of the other classifications as well, but as tourists they want certain types of information, including data on the best and most scenic routes, adequate information on detours, reasons why such-and-such a highway is closed to traffic, and why they will benefit in the future by this temporary inconvenience. Here we might say a word for the intelligent and effective use of signs. It is the custom in most states to erect signs at the ends of highway proj-

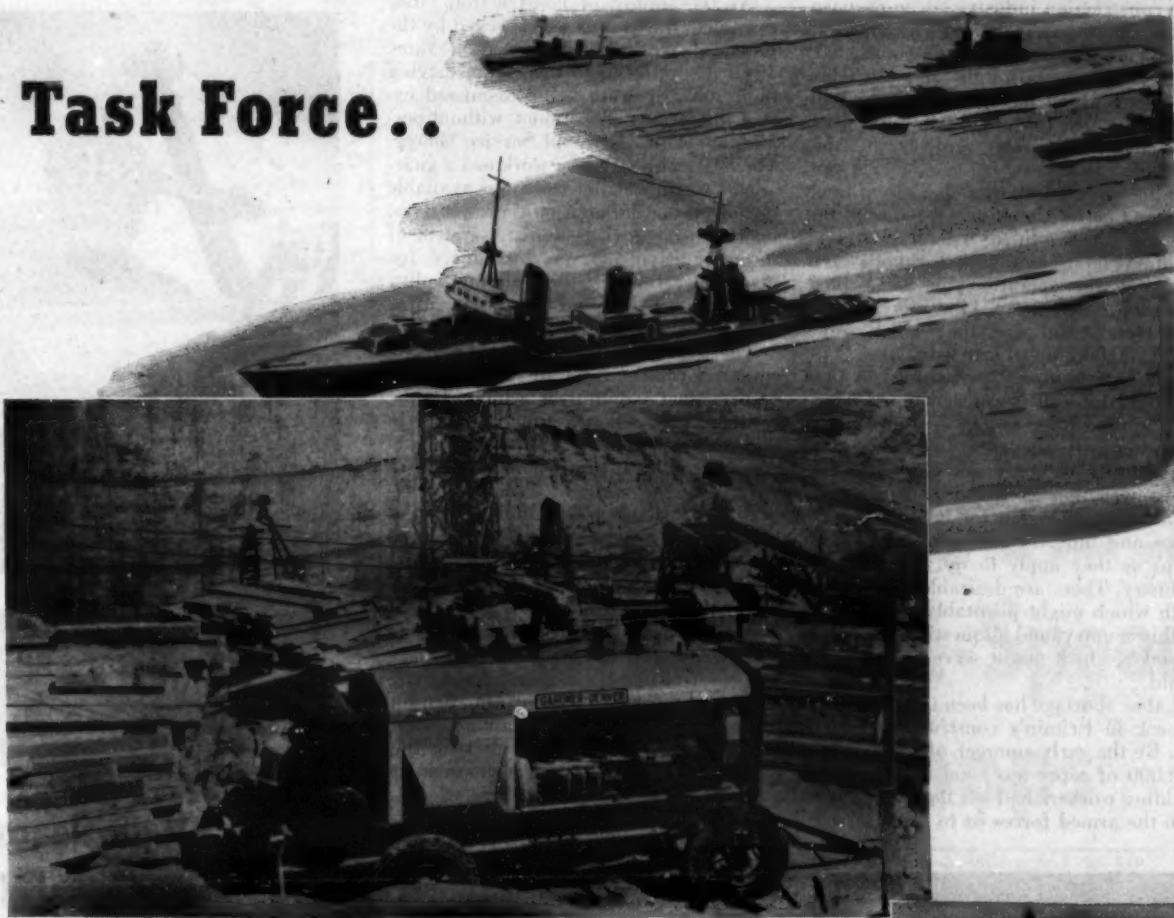
ects, but in general this opportunity to tell the public what is going on and why, and how the project will benefit the traveling public, has not been used as effectively as it can be.

The tourists who mean most to your state, as a whole, are the out-of-state vacationers, with money in their purses and a desire to spend it. They want to know where to go, what to see, where to stop, and what it costs. Special booklets and road maps for such tourists, attractively presenting the points of interest in the state and containing accurate information on how to get there, are appreciated. Special newspaper stories for distribution in neighboring states can aid in bringing in such visitors, and the state highway department is repaid in increased gas-tax revenue.

When any of your public as individuals band together in civic organizations, their interest and desire for information take on a new aspect. Here they are functioning as civic-minded members of the community, interested in civic de-

(Continued on page 60)

## Task Force..



YOU'VE heard of task forces—those units trained to do their tasks in the quickest, most efficient manner possible.

That same description applies to Gardner-Denver construction equipment. Able and willing to travel to a job, do it in the fastest, most economical manner and return to their headquarters ready for the next job, Gardner-Denver task forces are helping speed up construction of air bases, barracks and many other military installations.

Gardner-Denver water-cooled portable compressors are particularly striking examples of this ability. Equally efficient in desert heat or arctic cold—at sea level or high on a mountain side—they keep delivering at peak capacity.

GARDNER-DENVER UM-99 WAGON DRILLS are conveniently portable, and once on the job, can be quickly adjusted to any type of drilling—down holes, toe holes or for broaching. They are equipped for 6-foot steel changes—speed up drilling on deep holes.

THE S-55 SINKING DRILLS are noted for their perfect balance, speed and low maintenance. They cut down fatigue and increase footage—are precision-built for better balance and greater speed and power.

For complete information on Gardner-Denver construction equipment, write for descriptive bulletins. Gardner-Denver Company, Quincy, Illinois.

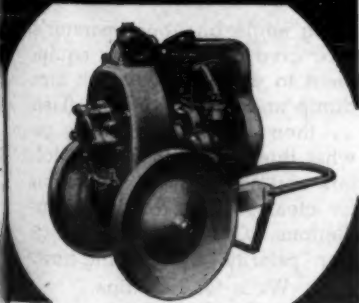


Gardner-Denver UM-99  
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Gardner-Denver S-55  
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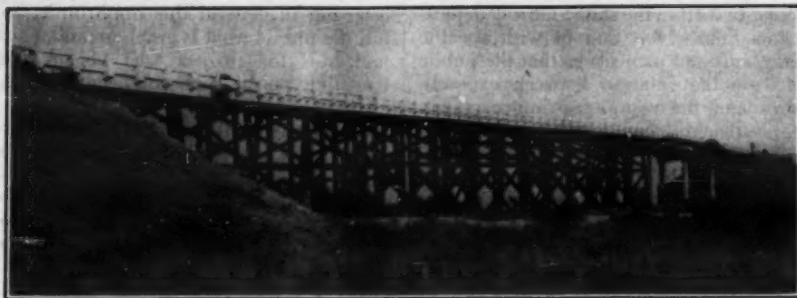
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THE JAEGER MACHINE CO.  
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Since 1859  
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A recent bridge-cost investigation, reported by the Wood Preserving Division, Koppers Co., suggests the economy of pressure-treated wood for structures such as the bridge shown above. The cost of building nine treated-wood bridges was \$70,900, as compared with an estimated cost of \$212,000 for other types of construction.

## English Construction Compared with U. S.

Many American construction men serving in the armed forces in England have had an opportunity to compare British with American methods of construction, and the results obtained by each. For immediately after Pearl Harbor and our entry into the war, the British construction industry began preparations for the arrival there of American troops and started building camps, barracks, offices, hospitals and airfields, many of which have been occupied by men who are thoroughly familiar with similar construction projects in this country.

This work, as reported in a recent issue of *The Central Constructor*, required the services of two-thirds of all civil and military labor available for both civil and military operations in the United Kingdom and, in a kind of "reverse lend-lease", had cost the British some \$600,000,000, up to last July.

The article goes on to point out that it would be well if construction leadership in the United States, as well as individual construction men, could have the opportunity to study not only methods of construction in Britain but also the whole British system of labor relationships and industry-government relationships as they apply to the construction industry. There are desirable features of both which might profitably be adopted in this country, and unquestionably some mistakes which might serve as things to avoid.

Labor shortage has been the main bottleneck in Britain's construction industry. By the early summer of 1941, some 600,000 of a pre-war total of 1,350,000 building workers had left the industry to join the armed forces or to work in war

plants. England had already practically suspended civil construction, aside from essential repairing and replacement of property bombed by the enemy. Private enterprise still conducts Britain's building, but does so under close government control. All firms have to be registered with the Ministry of Works, and a license is required for repairs costing more than \$400.

As the supply of construction labor dwindled, the exodus was checked by the Essential Work Order, issued in June, 1941. This prevented men from leaving their jobs, or from being dismissed except for serious misconduct, without permission of the National Service Officer. The order also gave the workmen a guaranteed wage, whether work was available or not, so that labor is paid on wet days, on which no work is done. A system of incentive payments was introduced for many operations in the building industry, bonuses being paid to crews for work over and above a fixed hourly output.

The report also mentions the widespread formation and success of labor-management committees which, in the construction industry, function directly on the site of the work. The most important activity of these committees has been to decrease absenteeism.

Britain's construction industry is described as bothered by a tradition of "casual" work, as America's was formerly handicapped by its seasonal character—a factor which had been minimized to some extent even before the war by the adoption of methods and devices making possible all-weather operations for many types of construction. Britain hopes after the war to eliminate much of the casual character of work in the construction industry in order to make it more attractive to younger men.

To this end, in February, 1943, a Gov-

ernment White Paper was issued, outlining a program for training building workers. The plans estimate that a construction program lasting for 10 or 12 years will require a labor force of 1,250,000 men. But Britain will by then have lost permanently from her labor ranks a large percentage of those who went to war or into war plants. As a result, an aggravated labor shortage is anticipated.

To meet this problem, the government plans to train up to 200,000 men during the first three or four years of the program. To make this opportunity attractive, it will seek to overcome the "casual" nature of British construction employment. It will not achieve this, however, through payments to be guaranteed by the government but will require the industry itself to solve the problem, through existing negotiating machinery.

In many respects, Britain is more advanced socially than this nation. In some ways, popular acceptance of collective bargaining has run far enough beyond ours, where the concept is newer, to make

decisions easier and less likely to be accompanied by violent disagreement between bargaining parties.

Finally, it is pointed out that the character of labor leadership in Britain differs materially in many instances from organizers in the United States. Therefore, a close observation of progress toward a solution of the post-war construction problems in Britain may contribute materially toward a smooth transition from war to peacetime construction in this country.

## British Columbia Plans Post-War Road Program

British Columbia is planning an extensive post-war highway program of 6,000 miles at an estimated cost of \$210,000,000, according to a recent report *Foreign Commerce*.

Among these projects are an express highway between Vancouver City and New Westminster, which will cost more than \$11,000,000, and three other direct outlets to the Pacific.



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a big smile on your operator's face give him this new equipment to work on ... watch him dump and get away in a flash ... then do a little figuring on what this means to you in dollars and cents and a reputation for clean-looking, on-time completions. Get yourself a post-war "priority" by ordering now. Write for bulletins.

Note: Tractor unit can be ordered to operate interchangeably with cable scraper on facing page. R-17

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Earth Moving Machinery  
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"Yes, sir — I can thank my lucky stars, I've got plenty of Sterling Wheelbarrows in the yard. For they tell me ALL wheelbarrows are frozen for the Duration ... not a single new one will be available until after the War. Frankly, I don't know what I would do without my dependable Sterlings on vital war projects. They certainly fill the bill."

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# Forms and Concrete For Navy Magazines

## Fifteen Magazines Poured With Same Forms, Plywood Lining Changed Each Three Pours; Used Local Aggregate

THE construction of fifteen igloo-type safety magazines for the storage of high explosives for the U. S. Navy provides interesting facts on character of aggregate, mixing water, repeated use of forms, and concrete handling on an isolated man-made island. The locale is a U. S. Navy Air Station in the south, where a ledge of hard lime rock on the edge of the dredged fill which created the storage area provided all aggregate.

A second-hand crushing and screening plant purchased by the contractor for \$1,000 did valiant service in providing 275,000 cubic yards of aggregate from 2-inch down to fines, for coarse aggregate and sand respectively. This rock was excavated in salt water and not washed, and was then used with fresh water for mixing. Not all of this aggregate was produced for the magazines, a large part having been used for foundations for other structures at the same and adjacent stations.

### Design of Magazines

The igloo-type storage magazines are somewhat different from those built by the Army and have some distinctive safety features to prevent damage to adjacent magazines or property in case of explosion. They are 50 x 25 feet in floor plan, and the arched shell has a height of 12 feet 1 3/4 inches at the intrados. The floor, which was poured first with the stud wall or key for the shell, is 5 inches thick on a graded sand foundation.

The walls and shell are reinforced with mesh and bars, which were welded at all crossings by a portable Lincoln electric welder and the ends welded to bolts set in the floor to prevent the accumulation of static within the magazine. They are also protected by lightning arresters set around the structure on the outside. A Dickey Clay Products vitrified-clay ventilator is set on the roof at one end. The single door at the front was at first a steel unit, but the later

doors are wood-Kalamein to reduce the use of steel.

A baffle wall to take the force of any explosion that might occur when the door is open was built about 15 feet from the front wall of the magazine and tapered similar to the end walls.

### The Wood Forms

The basis of design of the forms was panel construction, with re-use to as great an extent as possible. The single set of forms was used for all fifteen magazines in the group, with the 1/4-inch plywood lining being changed every three magazines. A total of six panels set by dragline formed the shell from end to end and from the base to the 3-foot flat section at the crown. The curved shell was designed with a radius varying from the haunch to the crown on the inside. The shape of the forms was controlled by 2 x 8's used as studs, cut to the varying radii, and covered with 1 x 6-inch square-edge form lumber. The form lining was 1/4-inch plywood which was oiled for each use.

Five sets of double 2 x 6-inch wales were held at the proper distance from the central radial points by braces cut to length and braced against the two lines of 4 x 4-inch timber spaced 3 feet apart on the floor. The lines of 4 x 4's were also braced against the bottom of the walls by 2 x 6-inch spacers and had 2 x 4-inch spacers between them. The inner and similar outer forms were securely tied with Richmond Snap-Tys.

The forms for the baffle wall at the end of the magazines consisted of 1 x 6-inch lumber with 2 x 4-inch studs spaced 18 inches on centers and five double 2 x 8-inch wales, except for the top set which were double 2 x 4-inch lumber. Richmond Snap-Tys were also used for tying these forms.

### Concrete Handling

The aggregate for the concrete was produced from a lime-rock deposit adjacent to the man-made island and was crushed and screened into coarse and fine aggregate. When concreting a magazine, a Jaeger 14-S concrete mixer was set up on each side of the magazine, with a P & H truck crane alongside of each



Official U. S. Navy Photo

A Naval high-explosives magazine under construction, with the inside forms in place and forms for the baffle wall partly assembled.

to handle the 1/2-yard concrete buckets. To permit easy discharge of the concrete from the mixers into the buckets, holes were excavated in which the buckets were set at the proper elevation for rapid filling. A total of 8 hours was required to make the 90-yard pour for one shell. The concrete was carried up as a monolith but was in three "lifts" as two openings were left in the forms to permit delivery of the concrete with the mini-

mum drop, thus preventing segregation. The concrete was vibrated as long as the mechanical vibrators lasted, and when they were worn out and no replacement parts were available, a "bootaerator" was employed. This term applies to a negro with large feet who trod the concrete into place. There was only a small amount of honeycomb in the shells inspected, which was carefully covered

(Concluded on page 67)



## Speed-up ...for bigger yardage and lower costs ...with Heil Hi-Speed Cable Scoops

These big 15-yard tractor scoops are push-loaded in 40 to 50 seconds. They haul at travel speeds up to 20 miles per hour. And that's speed in any language!... Tilting floor gives positive mechanical pushout from the bowl, spreads loads evenly. The matched tractor-scraper unit accelerates fast — steers without effort, by hydraulic power — turns on a dime — stops safely where you want it, with individual and unit-controlled air brakes. Fast, positive Heil Cable Control of the scoop... It's an operator's dream — and its extra speed on long hauls often represents the difference between a profit and a loss for you. With this modern equipment, you're the fellow with a reputation for "cutting the mustard". Get in early on post-war waiting list. Write for bulletins.

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The Novo pavement breaker.

### Paving Breaker Aids War Transportation

Breaking up pavement to speed the transportation of war materials may sound paradoxical, but such was the case on one of America's vital highways near Lansing, Mich. Heavy shipments of material had taken its toll from U. S. 16, and to insure a continued flow of armaments, high-speed repairs were absolutely necessary. These repairs varied from spot-patching to straight-away patching on 9-7-9-inch concrete pavement. Extreme care was required to protect underground installations, and mobility of equipment was needed to insure continuous traffic.

The contract for repairs was awarded to Ray Sablain of Lansing, Mich. The contractor's job foreman, Claude Van Conant, chose the Novo pavement breaker illustrated to do the job, reporting that "it's fast enough for the straight-away work and accurate enough for spot patching". A two-man team easily handled the outfit and the job completed.

### New Giant Compressor Diesel-Engine-Driven

The latest addition to the line of Worthington compressed-air equipment is the 500-foot diesel-driven Blue Brute portable air compressor. This new unit, developed particularly to meet war demands, will also have a place on many types of construction jobs in the post-war period.

The new Blue Brute has all the standard features of Worthington compressors, including the patented feather valve, articulated connecting rod, force-feed lubrication, enclosed clutch, sealed crankcase, sectionalized radiator and inter-cooler, structural-steel all-welded frame, and roller-bearing wheels. In addition, the nested air receiver and fuel tank make both the air outlet and the fuel-tank filler cap easily accessible from the ground. This 500-foot machine is available only with diesel power, being equipped with a Caterpillar D-13,000 diesel engine.

A new bulletin, H-850-B62, giving complete specifications is now available by writing direct to the Worthington Pump & Machinery Corp., Holyoke Compressor and Air Tool Dept., Holyoke, Mass., and mentioning this item.

### California Reports On War Maintenance

The maintenance forces of the California Division of Highways, although handicapped by lack of manpower, equipment, materials and supplies, have extended themselves since December 7, 1941, to provide normal service to the users of the highways, according to a report by T. H. Dennis in *California Highways and Public Works*.

It has been necessary to limit certain phases of highway maintenance, such as reducing the mileage of traffic stripes and changing from the solid to a broken stripe, a reduction in the care of roadsides and roadside plantings, occasional patrol of light traffic routes, delaying the spring opening of mountain roads closed by winter snow, and similar items.

The total traffic volume at the present time is about 70 per cent of the corresponding volume in 1941, but the truck and bus traffic volume is about 94 per cent of the 1941 volume, and heavier loads are being hauled.

There has been a constant increase in the cost of performing work, the report states. Wages have been increased as a

result of statutory increases and the wartime emergency increase. Delays result from the breakdown of equipment and deliveries of materials, and men are not available to fill in crews assigned to the major items of work. As a whole, the organization is from 25 to 30 per cent below minimum requirements in numbers. Many of the men lost to the armed forces and war work were the younger men, and although some replacements have been made, they are older and not as well trained or as adaptable. Women are being employed to some extent, as flagmen and on other light work.

While the organization is functioning well, a strain is felt whenever an emergency develops which requires long hours and night work. The report states that any state-wide or extended emergency period would cause a breakdown in the field service.

The matter of equipment is of particular concern. Only a few pieces of new equipment have been secured during the past two years and there have been no replacements. There are many units in service which would have been retired under normal conditions. For example, 22 per cent of the trucks, 20 per

cent of the power shovels, and 21 per cent of the motor graders are 7 years older, and 32 per cent of the snow plows are 10 years or older.

Naturally, as equipment gets older, breakdowns are more frequent. Since adequate stock of replacement parts cannot be carried by the state, and in many cases is not available, the breakdown of equipment in certain circumstances may come a serious matter.

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#### WHERE ELSE CAN YOU GET ECONOMIES LIKE THIS?

The big thing about Richmond's Pre-Fabricated Form-Tying Devices is their amazing low cost—on any kind of concrete form-tying job. For instance, on a 1/2" Tyscr you pay 39c and get 31c back on our working parts refund; cost just 8c!

Every Richmond Pre-Fabricated Form-Tying Device is correctly engineered so that every part of the assembly plays its full part for assured strength. Not "guessed strength" as in field assembled wire, band and rod ties! And where else can you get the same complete service as you do from Richmond's Job Planning Bureau, with engineering layouts, precise estimates, working suggestions, etc.? Send for your copy of "Form-Ty Engineering" and figure it for yourself. Yours for the asking!

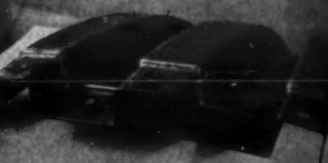
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Balanced design means strength without weight. Gage for gage ARMCO heavy duty liner is stronger (section modulus) than any other plate. Not only is vital metal conserved, but ease of handling and erection speeds the job and greatly reduces labor costs.

Other advantages include less excavating; interchangeable plates, fitted ready for installation; virtual elimination of fire hazards; better line and grade and strict adherence to specifications. When completed rings can be spaced to take advantage of partly self-supporting ground, fewer plates may actually be used.

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The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearings and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

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## Watching Highways During the Winter

**Allegheny County, Pa., Has 600 Miles of Road to Keep Free of Snow and Ice in Greater Pittsburgh Area**

WITH approximately 600 miles of county road to be maintained in summer, Allegheny County, Pennsylvania, the heart of the steel industry of the United States, finds winter maintenance an even greater responsibility because of the hilly terrain. Although no work is done on the state highway system by the county, there is sufficient snow and ice on the county roads to keep the Bureau of Maintenance of the County Department of Works on its toes.

For administrative purposes there are three divisions in the county, each of which has two districts, with a warehouse. At each warehouse are stored six 3-ton trucks, each equipped with a Ross reversible truck plow, and a power grader for snow removal. In addition, for emergency drifts, four Caterpillar Thirty tractors with bulldozers are distributed at the district warehouses, where they are most likely to be needed. At the Blawnox Warehouse, the nearest to the heart of Pittsburgh, there are also several V-plows for 3-ton trucks.

As soon as the Weather Bureau reports snow, every District Foreman goes out, as well as the Division Superintendents, to check on the condition of the roads in their respective districts and divisions. Plowing is started when there is about an inch of snow, and work is continued until the storm stops and all roads are clear.

### The Ice Problem

Because of the very hilly terrain of the entire county, the problem of ice control is important. Cinders, the most economical abrasive available in the county, are stockpiled at all hazardous points. Since slag is also a local product available in great quantities and is used in waterbound-macadam construction as well as in bituminous-macadam construction, the point has been raised as to why it is not used as an abrasive in ice control. The reason is that it crushes too readily when spread in a thin layer on ice and is too easily swept to the gutters by traffic.

All county highways are traveled constantly by the caretakers, or patrolmen, who, in summer, open ditches and culverts, repair the berm, and carry on other regular maintenance. In winter they are responsible for hand-spreading the cinders at all hazardous points.

Each of the six districts in the county has a truck designated for cinder spreading in winter, and it is equipped with a Model A Highway cinder spreader. No chlorides are used in the stockpiles of cinders, and none are added when the trucks are loaded from these stockpiles. Further, the stockpiles are not covered either by wood roofs, tarpaulin, or by other means to protect them from rain and snow, which might freeze in the



An Allegheny County, Pennsylvania, truck plow keeping suburban roads open in a vital war-production area.

stockpile and make loading difficult. Little trouble is experienced, however.

In the spring all accumulations of cinders on the roads or in the gutters are removed to a central stockpile for

redistribution in the autumn.

### Personnel

The maintenance of county highways, as well as financing, design, and con-

struction of county highways, bridges, and tunnels in Allegheny County is under the direction of the Board of County Commissioners, consisting of John J. Kane, Chairman, George Rankin, Jr., and John S. Herron. John B. Sweeney is Director, County Department of Works, with L. B. Duff, Chief Engineer. George L. Tenney is General Superintendent of Maintenance; Roy C. Huntsman is Superintendent of District No. 1 road maintenance; H. J. Foley is Superintendent of District No. 2; and W. H. Russell, Superintendent in charge of road maintenance in District No. 3.

### Construction in Bolivia

The Angostura Dam, under construction near Cochabamba, Bolivia, to provide irrigation for the Cochabamba Valley, is reported completed, except for the flood gates. Other work in Bolivia includes the construction of a section of the Corumba-Santa Cruz Railway, which was recently authorized, as well as a considerable amount of road work.

# WHAT IS MACHINERY'S No. 1 ESSENTIAL?

... IT'S LUBRICATION OF THE RIGHT KIND that will keep production machines in good operating condition and continuously on the job. Idle machines due to worn bearings, gears or chains, caused by improper lubrications are certainly on the blacklist these days . . . and remember that machine replacement parts are most difficult to get. Yes—the No. 1 essential today is proper lubrication.

★

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### 7 QUICK FACTS ABOUT LUBRIPLATE LUBRICANTS

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Level is easily and quickly attached to line.  
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C. & E. M. Photo  
Native-timber piles 50 feet long were used for the falsework for the Chattahoochee River Bridge on a new industrial access road in Georgia.

## Concreting the Deck For Georgia Bridge

(Continued from page 6)

6 inches and 25 feet on either side was poured, requiring 118 cubic yards of concrete. This was followed by the duplicate pour over pier 9, then an 85-yard pour about 44 feet 6 inches long adjacent to pier 10 and the similar pour at pier 7, and finally the central 40 feet between piers 8 and 9, amounting to 78 cubic yards. The delivery of central-mixed concrete supplemented by the 2-bag mixer made it possible to pour the 118 yards in 7 hours.

The concrete was transported from the agitator trucks, or the 2-bag mixer, in six 12-cubic-foot concrete buggies with rubber tires, but the loads were restricted to 10 cubic feet, with two men on each buggy. A splash board was used as the buggy was dumped to insure delivery to the center of the girder so that the mass would be spread uniformly by the three vibrators, one Jackson and two Master units. One was mounted on a small edition of a stone boat and could easily be pulled over the reinforcing by one man, the second was built with three legs and was difficult to move and also not easy to set up on the reinforcing, while the third, a "sports model" with a rubber tire and wheelbarrow mounting, could be wheeled readily over the reinforcing.

Because of the difficulty in getting bars bent accurately to the specified dimensions, the contractor had considerable use for a device that was made on the job and used to bend the ends of reinforcing to coincide with the plans. It consisted of a 1-inch square deformed reinforcing bar about 3 feet long, bent at the end to form a hook similar to the hook used with an eye to lock a door. It gave sufficient leverage to permit quick bending by one man.

Three levels were set up, two at the south end on the approach spans and one at the north end, to check the level of the forms during the pours. We could not quite make out why the levelman at the north end rated a shelter over his head, except that he had moved into the shelter provided for the hoistman when piles were being driven for the falsework. The use of three levels made it unnecessary to provide telltales beneath the bridge for measuring settlement of the forms. This settlement amounted to a maximum of  $\frac{1}{4}$  inch, which was compensated by taking up on the wedges beneath the forms.

The maximum depth of girders was 9 feet, and at those points the pouring was done with tremies for the first 4 feet; after that the buggies were dumped directly into the forms. The concrete crew was kept to a minimum, using only one man to a vibrator and only two men spotting and dumping the concrete. No spaders were required with the three vibrators.

The bridge deck was cured by covering with 4 inches of sawdust, which had to be thoroughly soaked only once to maintain the required moisture over the deck for seven days, the period of cure. We first reported the use of sawdust for the curing of a bridge deck on a Georgia bridge eight years ago (C. & E. M., March, 1935, page 2).

The finish of the piers was very good, resulting from the plywood lining of the panel forms used for them. They required a minimum of rubbing, which was done partly by hand and partly by Master and Mall concrete-finishing tools.

### Major Quantities

The major quantities involved in the construction of the Chattahoochee River Bridge, Project AWFAS 270-A (1), were:

Concrete, Class A, 3,000 lbs. at 28 days	3,350 cu. yds.
Bar reinforcing steel	290,000 lbs.
Excavation, No. 1, to bottom of footings	3,700 cu. yds.
Excavation, No. 2, below footings	400 cu. yds.
Concrete hand-rail	1,404 lin. ft.
Clearing and grubbing	8,222 acres
Channel excavation, diversion of small stream	1,000 cu. yds.

### Personnel

The new 701-foot 8-inch Chattahoochee River Bridge between Fulton and Cobb Counties, Georgia, was designed by the Georgia State Highway Department, G. T. McDonald, State Highway Engineer, and C. N. Crocker, Bridge Engineer. H. D. Loach was Resident Engineer and E. D. Reed, Assistant, for the State. G. L. Strickler of Austell, Ga., was the contractor, with H. E. Dunn as Superintendent.

### Goodrich Assignments

Announcement has been made by the B. F. Goodrich Co., Akron, Ohio, of the following new assignments in the organization: Richard S. Richardson, formerly General Manager of industrial products and sundries sales has been named head of the newly-created Chemicals Division; Arthur Kelly, who since the beginning of the war has superintended the construction and early operations of one of the largest government bomb and shell-loading installations as well as four synthetic rubber plants in the



C. & E. M. Photo  
A sturdy runway aided the fast pouring of concrete on a 701-foot concrete access-road bridge near Atlanta, Georgia.

government program, has been appointed Assistant Works Manager; and E. F.

## Tough War Jobs Help Develop Tough Machines

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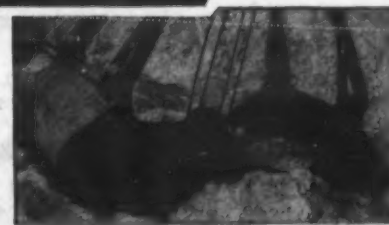
Mechanical foresight plus engineering genius has also protected certain types of Owen Buckets against the destructive action of the especially difficult conditions under which they are required to work.

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## Effect of Weather On Traffic Paints

### Will They Be as Durable If Applied in December As in May? The Results Of Extensive Tests

THE question is often asked, "What is the best time of year to apply traffic paints?" In making such paints, the paint manufacturer must meet certain requirements covering consistency, application, drying, hiding, color maintenance, visibility, durability, and other specified qualities. These requirements are met by the proper selection of pigments and vehicles, and correctly combining these materials.

There are, however, other factors governing the length of service of traffic paint over which the paint manufacturer has no control. These factors are related to the application of the paint, and should be taken into account by traffic men in the various state and county highway departments, as well as by airport managers, if the maximum service from such painted lines is to be obtained. For instance, the season of the year in which the paint is applied to the road, and the climatic conditions during the early days of exposure, have a direct bearing on the life of a traffic paint.

As a part of its 1942 traffic-paint testing program, the New Jersey Zinc Co. included a series of tests for the purpose of accumulating more information on this interesting phase of traffic-paint performance. In this investigation several paints were applied monthly over a period of five months to the same section of a concrete highway. The results as studied carefully in the field and from photographs indicate that:

1. Weather conditions during the application, drying, and exposure periods affect the durability of a traffic paint.
2. Excessive moisture during the first months of exposure of traffic-paint lines is generally detrimental to their durability.
3. Saturation of the fresh film with water accompanied by freezing temperatures tends to promote film failure. Impact of tire chains undoubtedly accelerates the rate of failure.
4. Exposure of the freshly dried

film to cold not accompanied by moisture is not detrimental to the durability of most traffic paints, even though the aged film is subjected to water and cold.

5. While a high-grade traffic paint may provide reasonably good service under adverse weather conditions, a poor paint will not provide good service even under the most favorable climatic conditions.

#### Select Your Month

Although the data justify the general conclusion that climatic conditions are a major factor in the service obtained from traffic paint, analysis of the data discloses a number of interesting points.

While the less durable types of paint do not provide satisfactory service, irrespective of climatic conditions, the highest types of paint may have poor durability if the weather conditions are unfavorable during the exposure period. It was noted in the tests made by the New Jersey Zinc Co. that the durability of the February applications, in the northeastern section of the country, of practically all the paints was poor. The temperature was below freezing during this application and for the next two days, then a rising temperature was accompanied by heavy rains, followed by freezing temperatures. It was below freezing an appreciable part of the time, accompanied by considerable snow and rain during the first two or three months of exposure. Such conditions place a severe strain on the paint film and, considering that for a large part of this time the film was subjected to the abrasive effect of tire chains, the general chipping and rapid wear of the traffic line would be expected. It is interesting that in a few cases the paint provided fair service under these severe conditions.

While it was cold during, and several days following, the March and April applications (approximately freezing in March and slightly above in April) there was no precipitation, and there was only one very short period (April 9 and 10) during these two entire exposures when there was sufficient snow on the road to necessitate the use of tire chains. The fact that in practically all cases the applications made on these dates provided good service indicates that cold alone is not necessarily detrimental to the durability of a traffic-paint film. The poorer service provided by the February applications must, therefore, be attributed to the severe soaking of the fresh paint films followed by freezing

and/or the impact of tire chains.

In general, the May application provided poor service, averaging better only than the February applications. The poor durability of this series may also be attributed to the weather conditions during the early exposure period. It was a very rainy season. The absorbed water content of the films was high, reaching the saturation point for periods extending over several days. The lower abrasion resistance of wet paint films undoubtedly accounts for the poor durability of this series.

The June application is representative of the maximum gallage of traffic paint actually applied to highways. This series averaged slightly poorer than the March or April exposures, but better than either

the May or February applications. The climatic data indicate that the weather was normal. The poorer durability of the series, compared to the March or April applications, must be attributed, therefore, to the greater amount of traffic the lines received, that is, winter versus summer driving.

We are indebted to *Paint Progress*, published by the New Jersey Zinc Co., New York City, for the material on which this article is based.

#### A.R.B.A. Convention

The Forty-First Annual Convention of the American Road Builders' Association will be held at the Edgewater Beach Hotel, Chicago, on Feb. 1, 2, and 3, 1944.

## GEERPRES TANGLEPROOF MOP STICK

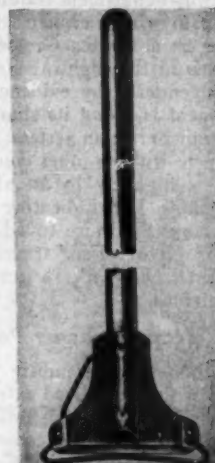
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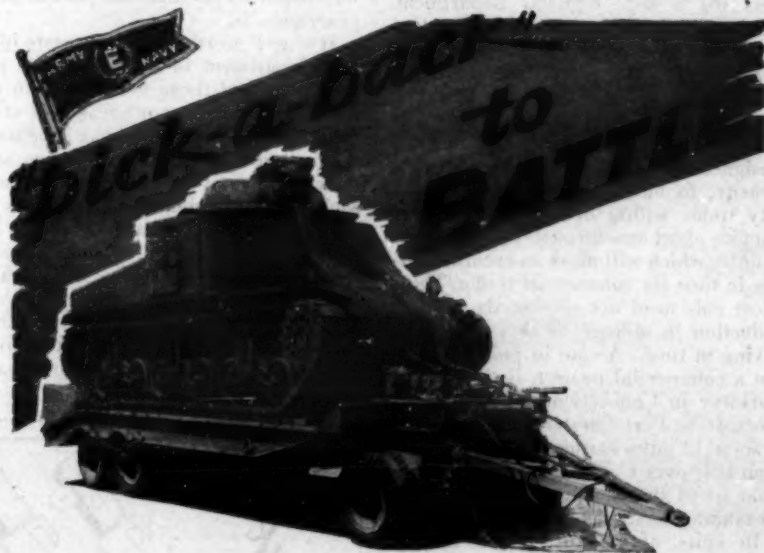
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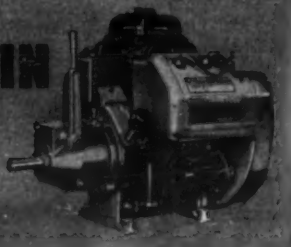


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In today's war production set-up, even the saving of fractional manpower for servicing grease cups and oil fittings is important. And neglect of this attention can mean serious damage to irreplaceable production equipment. This can't happen with Wisconsin Engines because there are no grease cups or oil fittings; no lost manpower; no chance for human error or carelessness. Wisconsin Engines are protected by positive force-feed and splash lubrication. You get more "Service" with less "Servicing."

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World's Largest Builders of Heavy-Duty Air-Cooled Engines



## The Public's Interest In a Highway Program

(Continued from page 53)

velopment. They want to know what proposed improvements are being considered, why they will benefit the locality, and what the general plan is behind each new project. The broader picture of highway programs can be given to them, and their support for such programs is of tremendous value to the state highway department.

As far as competing transportation systems are concerned, information about the plans and activities of the highway department should be presented to tie in with the state's transportation plans as a whole. Greater public confidence in the highway department will be engendered by evidence that the department is doing its share to complete the transportation system, rather than to compete with its other component parts. A new highway to an airport can be dramatized by indicating the highway department's desire to add to the time-saving factor of air travel by reducing the time necessary to get to and from the airport.

### Your Highway Program

Although your public must be supplied with specialized information suiting the interests of each different group, a highway program cannot be created in the same manner. No hit-and-miss spotting of a road here for this civic organization, a cut-off designed to make a powerful trucking organization happy, or a roadside park there because some garden club wanted it, would spell success for a state highway department. Each state has a concerted construction and maintenance program, aimed to serve the best interests of highway transportation throughout that state, based on the use of each highway in sufficient amount to warrant the expenditure, and designed to care for the known traffic density, to meet that problem-child of city traffic within urban areas, and to provide short cuts through cities or cross country which will mean an eventual saving in time for commercial traffic. These short cuts need not necessarily mean a reduction in mileage, if they provide a saving in time. A case in point, though not a commercial project, is the Merritt Parkway in Connecticut where the distance from Port Chester to New Haven is some 12 miles farther on the Parkway than it is over U. S. 1 but, under peacetime speed limits, the time of travel is 40 minutes less.

In spite of pressure from various groups, a properly balanced program of construction will always satisfy the majority, because engineering planning is common sense applied economically to the problems of the people. But the people must be told about it.

### Telling the Public

Having created your economic highway transportation program and analyzed your public, you are ready to tell that public what they want to know. The question now is, how do they want to receive that information?

It is sometimes difficult to present a complicated long-range state-wide program to the average man, singly or in groups. Engineering societies and construction groups can absorb such programs more readily. But the program can be simplified and described well in feature articles, preferably prepared by the feature writers of large newspapers from detailed information furnished by the state highway department. It is generally not satisfactory for a state highway department itself to prepare such feature articles, as there is often a tendency by the man preparing it to play up that feature which will come nearest to

insuring the continuity of his own job—namely the pet project of his superior. If this danger is avoided, there is always the tendency to presuppose a greater knowledge about highways and the activities of the highway department than the general public actually has, and by so doing greatly decrease if not entirely destroy the value of the article as public education. If the department will furnish information to reliable feature writers of reputable accepted newspapers, to whom their readers are accustomed and look to as authoritative writers, excellent results can be secured.

Authoritative information on single local projects or groups of projects is welcomed by luncheon clubs in the form of short illustrated lectures. Such clubs are made up of a cross section of business, professional or civic leaders in the community—in other words, men and women capable of carrying your message to even larger groups of taxpayers through discussion of current events and topics of community interest with their friends. Social clubs, civic organizations, and women's clubs welcome speakers from state departments which have a real message of progress and activity. An opportunity to reach future citizens has been neglected in the program of telling the public about our highways, and that is through the schools. Arrangements could be made for short talks, at school assemblies or to the civics classes, on the part highways play in the economic and social life of the community and the future plans of the highway department to increase their service and effectiveness. Such a program serves a twofold purpose: the children report at home what they have learned, thus passing on the message to their parents, and as future citizens they will be better informed about their highway departments than the present adult generation is.

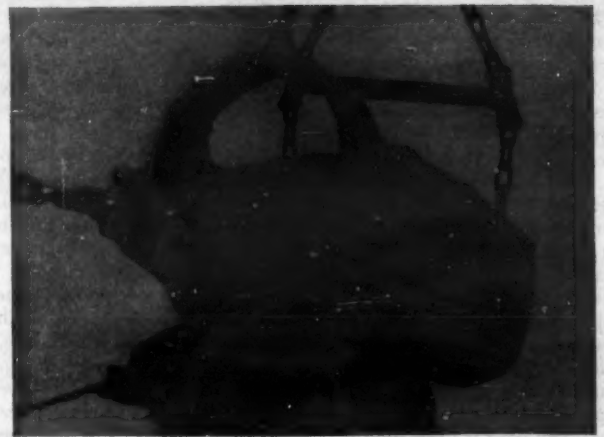
It is well worthwhile for a state highway department to go through its personnel to find those members who can speak well, for a poor speaker is of no value; if necessary, provide a little training in public speaking; and then send the right type of man or woman to cover each specific assignment. We know of one state highway department which has made admirable use of a young woman from its headquarters office as a speaker before women's civic organizations and garden clubs, because she talks their language in putting over the state highway department's message, and really sells the program.

We have been considering the highway department program in its entirety, or large projects. Now let us consider the run-of-the-mill projects in which the smaller communities are interested. To reach these communities, the small daily and weekly papers, which incidentally are far more potent organs than some of our metropolitan dailies, will serve

you well. There are several state highway departments which send out a general news release of 100 to 150 words, with a blank date line to be filled in by the local paper, and a second paragraph with blanks to be filled in from the appended list of projects awarded. The method has its advantages from the

(Concluded on page 65)

weighs less... **digs more!**



*Lightweight*

Here's how you can step up your yardage... move more material and move it faster... with your present machines, regardless of their normal capacity.

You can get increased yardage by using a larger bucket than that for which your machine was designed without exceeding the allowable loaded weight. This also applies to long boom operations. But you must have HENDRIX Lightweight Buckets! They're lighter... we've taken the load out of the bucket itself, to enable you to put bigger loads inside. In wet digging, you get an extra bonus pay load every trip by leaving the water in the pit. HENDRIX Lightweights give you strength, toughness, durability, plus many inbuilt features designed to increase your "digability."

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ Manganese steel chains, fittings and reversible tooth points.
- ★ All Welded construction... for greater strength and durability.
- ★ Gets full load pay material every trip... even in wet digging.
- ★ 3 types—light, medium and heavy duty— $\frac{1}{2}$  to 20 cu. yds.

WRITE FOR DESCRIPTIVE LITERATURE... OR ASK YOUR DEALER

**HENDRIX**  
*Lightweight* DRAGLINE  
BUCKETS

DeSoto Foundry, Inc.—Mansfield, Louisiana



**Brooks**  
**LOAD LUGGER**

Use 5 to 10 detachable "bodies" or dump buckets with each Load Lugger, depending on the length of haul and number of men in crew.

When your material handling jobs are slowed up by truck shortages, lack of manpower, or rationing of tires and gas... then it's time to equip your trucks with Brooks LOAD LUGGERS.

This hydraulic hoisting unit fits on any truck chassis, and operates with one-man control... loading or dumping requires only 15 seconds. Cuts costs, conserves equipment, saves time, and ends "Bottlenecks".



Write for  
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**Brooks** EQUIPMENT AND MFG. CO.

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In Wartime**

will be happier for all  
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THE SALVATION ARMY  
WAY



SHARE YOUR CHRISTMAS  
through  
THE SALVATION ARMY

ON EVERY FRONT



## Careful Attention Makes Asphalt Roads Last Indefinitely

No road surface has yet been devised which will withstand the lack of a suitable subgrade and foundation. Given the proper base, road surfaces of various types are still liable to deterioration through weathering, oxidation and wear. A method by which an asphalt road surface can be maintained in prime condition at a cost of less than \$150 per mile per year was noted on a recent visit to St. Simons Island, Georgia, where the roads are built and maintained by Glynn County.

This is really the story of a road, constructed in 1925, which has been through the vicissitudes of highway life and come out successfully in the end. In 1925 this road was built with a lime-rock base primed with 0.25 gallon of tar per square yard and then surfaced with 0.4 gallon of 200-penetration asphalt and covered with 45 pounds of  $\frac{3}{4}$ -inch slag per square yard. In 12 years the road surface finally went to pieces, principally due to one bad freeze and thaw which broke up lime-rock base throughout the south.

In 1940 the road was surfaced with a cold-mix consisting of 30 per cent local fine sand and 70 per cent Altamaha River sand which has 20 per cent retained on a 10-mesh sieve. This mix was made with  $\frac{3}{4}$  gallon of RC-2 per cubic foot of this blended sand and laid down at from 80 to 110 pounds per square yard after the old surface treatment had been given a tack coat of 0.15 gallon of RC-2 per square yard.

In one section where the road fill was over a marsh area and showed considerable subsidence, as much as 4 inches in waves, the undulating surface was corrected by running a Barber-Greene tamping-leveling-finisher back and forth over the depressions and filling them up with a small compacted layer of cold-mix at each trip. It was feared that where the layers were feathered out at the ends the joints would show as cracks but the surface has maintained its integrity, showing no failures.

After two years of service this pavement was given a flush coat of 0.15 gallon of RC-2 per square yard, and in some places blotted with a light scattering of the fine local sand. This flush coat is the secret of the life of this or any other asphalt pavement. It gives pliability to the

surface of the road, the blotting with fine sharp sand gives a sand-paper finish, and the life of the surface is extended for an indefinite period and can again be renewed as required at not more than  $1\frac{1}{2}$  cents per square yard. If done at periods of two to four years, the surface will maintain its life and, given a strong base, it does not ravel or break.

The coarse sand used on this pavement was not exactly ideal but, being available from a nearby source at small cost, was used to keep the cost of the paving low. It is hydrophilic, attracts water, causing the asphalt to strip from the aggregate. This was noted in several places, particularly at curves where the sand was piled at the sides by the action of automobile tires making the turn. The flush coat tacked down the lean surface and thus saved aggregate and bituminous binder.

We are indebted to H. J. Friedman, Engineer-Director of Glynn County, for the report on this method.

## Volume Production of Synthetic-Rubber Belts

As a measure to alleviate the threatened shortage in transmission and conveyor belting, due to the shortage in natural rubber, the U. S. Rubber Co., New York City, has announced volume production of synthetic-rubber belting at its plant in Passaic, N. J. The base of the product is cotton fabric, which is processed by forcing the synthetic rubber through the pores by rollers, after which the material is fabricated into the required sizes, ready for use on essential war projects.

## Airports for Ohio

A 20-page mimeographed bulletin, "Airports for Ohio", has recently been prepared by the State of Ohio Bureau of Aeronautics with the cooperation of the Airport Division of the Civil Aeronautics Administration. It presents a study of post-war aviation in Ohio and the need for more airports built by cities or as joint projects of two or more cities, or counties.

Following a discussion of the CAA classification of airports, the report presents information on the selection of airport sites as regards distance from community centers, size, topography, obstructions on adjacent property, soil characteristics, meteorological condi-

tions and other factors which should be considered. Two series of sketches show the stage development of airports so as to reduce the initial expenditure, but permit expansion and development in an orderly, economical manner without the loss of earlier investments in the project as the airport reaches a maturity.

Copies of this bulletin may be secured

from the Ohio Bureau of Aeronautics, 501 Wyandotte Bldg., Columbus 15, Ohio.

## Shovel Co. Changes Name

Announcement has been made that the Universal Unit Power Shovel Co., of Milwaukee, Wis., has changed its name to the Universal Unit Machinery Corp.

# BUSTING ROCKS

... not the buster points!

DRIVEN by a 14 ton shaft! Dropped 9 feet four times a minute! You couldn't think of more severe service than that to which these rock buster points are subjected! Yet they are standing the gaff. Because of their Coast Metals hard-facing, they possess exceptional resistance to impact, shock and wear. And give several times the life of ordinary points!

Coast Metals hard-facing is equally applicable to new parts or old ones, of any ferrous metal, including manganese steel, cast iron and chilled iron. Easy to apply—by the electric welding arc or oxy-acetylene torch.

Let our engineers show how you can use Coast Metals hard-facing to keep your equipment on the job without frequent time out for repairs or replacements!

COAST METALS, INC.

Plant and General Offices: Canton, Ohio  
Executive Offices: New York, N. Y.



# COAST METALS

hard-facing  
weld rods

MAKE YOUR EQUIPMENT LAST LONGER



for Time and Labor  
Savings on every job

Build YOUR post-war plans around trailer-moved tools, machinery, supplies and materials! You'll enjoy greater efficiency, greater profit and prestige by applying modern trailer engineering to all your operations.

Ben-Hur engineers are ready now to help you "Trailerize" for greater post-war progress and profits. Return the coupon TODAY for preliminary data and a handy "Service Sheet" for your use.

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Please send me data on Ben-Hur Trailer Engineering in our industry and a Service Sheet that may use to obtain more detailed information.

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**TRAILER ENGINEERING**  
Your Planning Aid for  
Tomorrow's Progress



Model 210G, on skids.  
Also 2 or 4 steel or  
pneumatic wheels.

# LE ROI COMPRESSOR

THE ONLY ONE IN WHICH BOTH ENGINE AND  
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You enjoy  
smooth-run-  
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work with Le Roi Compressors,  
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balanced compressor crankshaft,  
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... See your Le Roi dealer for  
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orities on new compressors. C-21C

# Le Roi Company

1714 S. 68th St., Milwaukee 14, Wis.







C. & E. M. Photo  
A cobbler in metal welds old snow-plow blades together to make shoes for snow plows.

## Shop Proves Worth In Wartime Economy

(Continued from page 11)

A handy piece of equipment that has saved many dollars in rental charges in the Division is a 7 x 12-foot flat-bed light trailer made from the axle of a White truck extended to give a wider space for the bed. This is used to move light equipment that otherwise would have to be towed at a reasonably slow rate and also saves the cost of the large trailer which runs about \$40 per trip. Robert Morlock, the Garage Superintendent, now complains that he should have made the trailer wider and heavier so that it could have hauled even larger equipment and effected further savings.

A booster truck for the bituminous work was made in the shop by mounting two 500-gallon water tanks on a 1936 White chassis. One was mounted cross-ways at the front and the other cantilevered out over the end of the truck. Each is equipped with flues and a torch for heating the bituminous material in transit.

### The Shop and Its Equipment

The shop and garage, a 94 x 276-foot yellow-brick and concrete structure located back of the Division offices, runs east and west and has a wide corridor leading to the office section on the north

side. Along the south side are large windows, while the north wall is solid with windows near the roof, which is of corrugated metal coated with asphalt and supported by steel trusses. The heating plant is located outside the main structure along the south wall. Coal fed by mechanical stokers is used to provide steam for the unit heaters in the shop section and radiators in the office building.

At the east end of the garage is the oil room where lubricants for immediate use are stored in drums. Hand pumps are used for dispensing. Immediately outside the door is a soda-and-acid-type fire extinguisher mounted on the wall in a panel of white surrounded by a wide red stripe, making it easily located even under blackout conditions. Fire hose is also similarly highlighted in other locations.

Also in the southeast corner is the carpenter shop, equipped with a band saw, saw table and sander, where tool boxes, garage doors and other wood products are made as needed. Signs are made at the Columbus shops and shipped out to the various divisions. One of the products of this shop is a large box 4 x 5 feet x 30 inches high mounted on a stand at truck-body height at the east end of the garage. It is painted a high-visibility yellow with the word "EMERGENCY" on the sides. It contains rope, picks, lanterns, arm bands, first-aid equipment, and all other needs for the local Disaster Squad. It is mounted on rollers so that it can easily be moved onto the bed of the first truck available in case of need. Ohio was one of the first state highway departments to organize disaster squads throughout the entire state so as to be ready for any emergency of man or nature. These squads went into action during the spring floods of June, 1943, to great advantage in the southern part of the state.

Also in the east end of the garage is a broom winder where the rotary brooms for cleaning road surfaces preparatory to priming for resurfacing as a maintenance operation are located.

The garage is furnished with two overhead doors in the south wall toward the ends and one of the same size in the west wall. Along the south wall are the mechanics' benches, which are almost continuous except for the break at the center for entrance to the heating plant. A Weaver double hydraulic lift for trucks is near the east end for greasing operations. The truck being lubricated at the time of our visit was equipped with one



C. & E. M. Photo  
The Division 12 "smithy" builds a safety guard for a clinder spreader.

of the winter "dog houses" to protect the men working on the sanders. These are small plywood sheds built in the front end of the dump bodies where the men can go and be reasonably protected from the weather while the truck is dead-heading. The greasing is done by a complete Alemite portable pneumatic lubricating outfit.

A small machine shop along the south wall is set off by a heavy wire cage to protect the machines. The equipment includes a Baldor power buffer and grinder, a Marvel power hack saw, a Champion 20-inch drill press, a Chicago brake lining riveter, an Atlas 60-ton hydraulic press, a King System motor tune-up outfit, a Hall Mfg. Co. valve grinder in a locked cabinet, and a long metal-top bench.

Just outside the machine shop is a

Unitron battery charger and a Thompson Products Co. Magnaliner for aligning the wheels of trucks. A U. S. air compressor garage unit provides all the air for the entire garage.

Along the south wall under the windows are the metal-top benches for the repair mechanics. A track and overhead chain falls is being installed in front of these benches to reduce the need for constant moving of the D. Round & S. floor crane. Along the benches are sufficient number of machinists' benches and spotted along are a mechanic's punch, a spark-plug cleaner, and a small Baldor bench grinder and buffer.

In the southwest corner of the garage is the blacksmith and welding shop, equipped with a forge, anvil, power grinder and buffer, a set of Modern Engineering Co. acetylene cutting tips and welding torches, the gas cylinders with Airco pressure gages, and a General Electric 300-ampere electric welder. Adjacent to the blacksmith shop is a blueprint room and then in the northwest corner is the sign department where highway signs needing repainting are overhauled.

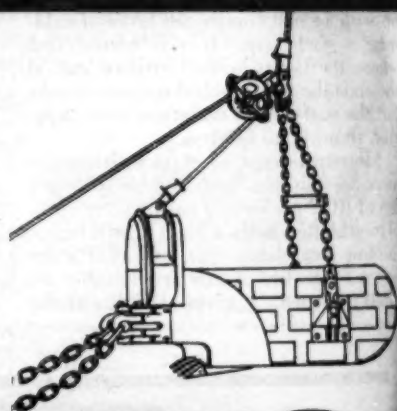
Starting back along the north wall in our tour of the garage, we come to the equipment washroom with a Kerri-Kleaner, and then to the paint shop with a DeVilbiss spray paint outfit. A well-appointed washroom at the center of the north wall has toilets, a Bradley Wash fountain, showers, and a locker room with separate lockers for each of the men working out of the garage or in it. At the side of the door to the corridor leading to the office building and adjacent to the door to the stock room is a large Fyr-Fyter extinguisher on a pair of 4-foot 3-inch iron wheels.

(Concluded on next page)

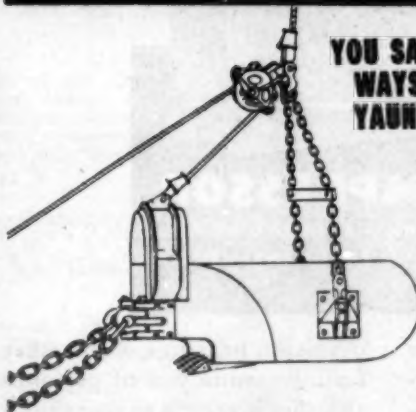
## YAUN'S BASKET TYPE ALL-WELDED BUCKET

YAUN'S basket type bucket is an innovation in the digging field. It is a duplicate of the shell type, except that the rear is made of heavy flat bars, instead of sheet steel. When handling wet dirt, there is no suction to hold back the discharge. It is designed to handle any loose material, except "soup." The dirt does not fall through the holes.

This basket type bucket has the same arch as the shell type, which is proof against distortion—you'll never see a Yaun Bucket with the front "caved" in. The lip is also stellite, which makes it last longer and has the same connection between arch and lip as the shell type. These buckets are equipped with American manganese tooth bases with removable tooth points.



### YAUN'S SHELL TYPE ALL-WELDED DRAGLINE BUCKET



### YOU SAVE THREE WAYS WITH A YAUN BUCKET:

- 1 More pay load, less bucket weight for same gross weight, more yard per cycle at same cost.
- 2 Faster dumping means more cycle per shift at no additional cost.
- 3 Less dead weight to swing back, faster, return and more cycle per shift at no additional cost.

YAUN'S shell type bucket is furnished with American manganese tooth bases and removable tooth points. The bottom of the lip is stellite and as the top wears, the bottom remains and the lip to become exceedingly sharp. The lip is guaranteed to remain sharp during the life of the bucket. The arch is so constructed that it adds strength and durability to the front.

The weight of this bucket is about one-third lighter than that of any other bucket of similar capacity, yet you'll find it will last longer. This will naturally enable you to move from 30% to 50% more dirt at no increase in cost—often the difference between profit and loss of a job.

**YAUN DRAGLINE BUCKETS & MFG. PLANT**  
BATON ROUGE, LOUISIANA

*Alert Contractors!*

Buy the

# JACKSON

Hydraulic  
Concrete  
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for Dependable, Speedy  
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★ THEY CAN TAKE IT! ★

24 HOURS A DAY  
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Automatic pressure regulation—requires no attention.

34-ft. hose—2 1/2" vibrator head.

Adjustable frequency to 6800 R.P.M.—submerged in concrete.

Powerful gas engine—4.7 H.P.

Long-lived, ball-bearing, rotary, hydraulic pump.

**ELECTRIC TAMPER & EQUIPMENT CO.**  
LUDINGTON, MICHIGAN



# Well-Managed Shop In Ohio Division 12

(Continued from preceding page)

## Parts Department and Storage

The 24 x 106-foot stock room along the north wall of the garage carries a full line of tires for the equipment used in the Division, has metal bins for the small parts, metal racks for the stock of grader blades, and extra storage for unopened drums of lubricants. There are large metal shelves for hand tools and the larger parts as well as for small equipment. Also on the second floor over the carpenter and oil room is further storage for materials that move more slowly. A pair of Sun motor testers are kept in the store room and are covered with plywood cabinets for greater protection when not in use. Also a Misco portable battery charger is stored here ready to be taken to outpost stations to help trucks engaged in snow plowing, which is probably the greatest drain on batteries.

Spare parts that can be hung up, such as gaskets and fan belts, are mounted on easily accessible boards on the walls of the stock room. There is scarcely a square foot of the floor area, except for the necessary aisles, or of the wall space that is not used effectively for the storage of the multitude of parts and replacements needed for a busy division garage.

## The Offices

The office building is a duplicate in size of the shop and garage and contains all the offices of the Division Engineer, Assistant Division Engineer, the



U. & E. M. Photo  
Robert E. Willems, Division Engineer,  
Division 12, Ohio Department of Highways.

Construction and Maintenance Engineers, the accounting department, lobby and receptionist's office, drafting room, and all other facilities.

## Personnel

Hal G. Sours is Director of the Ohio Department of Highways, with Robert E. Willems, Division Engineer, Division 12, located in Garfield Heights, just outside of Cleveland. Howard Palmer is Assistant Division Engineer in charge of maintenance and Robert Morlock is Division Garage Superintendent.

## Plastic Instruments

Due to the shortage of metals and the ever-growing and urgent demand for precision instruments by the armed forces, new materials and new methods

of obtaining the desired accuracy had to be found and developed. Such a material, known as Emeloid plastic, has been developed by the Emeloid Co., Inc., 287-291 Laurel Ave., Arlington, N. J., which has patented processes by which this material is accurately fabricated for all types of engineering instruments, from slide rules to the most complicated charting and calculating instruments for the armed forces. These Emeloid instruments are said to be light in weight, accurate, inexpensive, and employ no precious metals or rare materials.

Further information on this line of Emeloid plastic precision instruments may be secured by interested contractors and engineers direct from the manufacturer by referring to this magazine.

## New-Type Face Shield

A new shield for protecting the face against flying particles has been developed by the Mine Safety Appliances Co. This Type H Faceshield, of clear, transparent plastic 14 inches wide x 6 inches

long, is designed for quick attachment to the M. S. A. Type K Skullgard protective hat, and may be easily adapted to most Skullgards now in use.

Bulletin No. CE-22, giving further details on this unit, may be secured from the Mine Safety Appliances Co., Brad-dock, Thomas & Meade Sts., Pittsburgh, Pa., upon written request, mentioning this item.

## Air-Compressor Catalog

Schramm air compressors in both portable and stationary models are described and illustrated in a new catalog issued by Schramm, Inc., West Chester, Penna. Features of each of the various models as well as their specifications are given, and job photographs showing the variety of uses to which Schramm compressors have been put on construction and maintenance projects are included.

Copies of this new catalog "Schramm Air Compressors" may be secured by those interested direct from the company by referring to this item.

THERE'S a very good reason why Carver pumps are serving today on hundreds of tough jobs where other pumps failed... it's because CARVER design licks trouble before it starts!

Mud, sand and grit hold no terrors for a Carver pump because:

1. Carver "streamlined" water flow through the pump is unobstructed by "gadgets" that clog up or impede the flow so that foreign matter is deposited inside the pump.
2. Carver impeller design limits wear to one side of the impeller only, which means longer useful life even under highly abrasive water conditions.
3. Carver "Lifetime" Seal of Tungsten Carbide is hard enough to cut glass; far too hard for sand or grit to abrade!

If you want more water with less power, longer pump life with less down-time for repairs, you'll be hours and dollars ahead with a CARVER. Write or wire today for complete information on CARVER Centrifugals, available in capacities from 5,000 to 125,000 GPH, gasoline engine, electric motor or belt-driven models.

Carver Pump Co., Muscatine, Iowa

**CARVER**  
Centrifugal  
Certified



586 Top-Notch Service Plants  
for  
**REBUILDING**  
your construction equipment



The  
"A.E.D."  
Symbol  
is Your  
Safeguard For  
New Equipment  
and  
Its Repair

\*Members in Mexico not indicated in map.

Every spot you see on this map represents a machinery distributing organization with complete facilities for servicing and rebuilding your construction equipment.

Many of these companies have branches for additional service.

Each is a member of the ASSOCIATED EQUIPMENT DISTRIBUTORS, an international organization conspicuous in the construction field for its accomplishments. The "A. E. D." symbol you see displayed by these distributors in their advertising, on their letterheads or show windows, is your assurance of integrity, square-dealing and reliability.

At each of these distributing headquarters you will find construction equipment engineers, trained and expert mechanics, large stocks of parts and machinery for rebuilding and remanufacturing war-worn machines. You know your equipment is in good hands when it is at an A. E. D. Shop.

**ASSOCIATED EQUIPMENT DISTRIBUTORS**

National Press Building, Washington, D.C.

AN INTERNATIONAL ASSOCIATION WITH MORE THAN 500 MEMBERS



## YOUR BLOOD CAN SAVE HIM



### Bill for County Aid Introduced in Senate

Senator Stewart of Tennessee early in November introduced a bill, S.1498, that would set up a new agency in the Federal government, known as the Rural Local Roads Administration, for the purpose of administering Federal-Aid funds for county and other local road construction. The bill specifies that the Commissioner who would head this new department must have had at least ten years' experience in an administrative or engineering capacity in one or more county highway agencies. The appointment would be made by the President, with the advice and consent of the Senate.

An initial authorization of \$1,125,000,000 is provided in the bill with the stipulation that it becomes available at

the rate of \$375,000,000 a year for each of the three years immediately following the termination of the war. Provision is made that the new agency can enter into agreements with county highway departments and other local political authorities for the making of surveys and plans and the acquisition of rights-of-way for post-war highway improvement and that such agreements shall constitute contractual obligations on the part of the Federal government for the payment of its pro rata share when the funds are made available at the end of the war.

The bill provides that the funds will be apportioned in the first instance among the states in accordance with the provisions of the Federal Highway Act of 1921. From the state level down, the bill would apportion the funds among the counties and other local political subdivisions on the following basis: 50 per cent in the ratio that the mileage of roads used for rural mail delivery, star routes, or school-bus service in each county or other subdivision bears to the total mileage of such roads in the state; 30 per cent in the ratio which the population of each county or other political subdivision bears to the total population of the state; and 20 per cent in the ratio which the area of each county or other political subdivision bears to the area of the state.

As to the amount of local funds required, the bill specifies that the Federal share shall be 75 per cent and that where necessary for the expeditious completion of projects the government may advance the Federal share of the cost of any project. Funds for county road construction would remain available for matching for a period of three years when, if not matched, they would be apportioned among the other counties in the state.

Sums allocated to towns or townships would remain available for matching for two years, at the end of which time they would be reapportioned among the towns or townships within the same county.

As a prerequisite to obtaining Federal Aid, the bill requires counties to meet certain minimum standards as to competency. Provision is made, however, that where counties or other political subdivisions are unable to meet the standards on qualifications they may unite with other counties to organize and maintain a joint qualified highway department. Counties unable to meet the Federal requirements may negotiate with their state highway department to perform on their behalf the construction services required by the bill.

### New Robins Bulletin

A new bulletin showing the latest development in Robins products and giving a brief sketch of the various parts of the world where this machinery is used has been prepared by Robins Conveyors Inc., manufacturer of materials-handling equipment. A number of photographs are included, showing the individual pieces of equipment, and the complete units in action.

Those interested may secure copies of

Bulletin No. 125 CEM by writing direct to Robins Conveyors Inc., Passaic, N. J.

### WPB Simplification Of All Jack Models

The War Production Board has issued an order as of November 8, 1943, simplifying and standardizing the models and sizes of mechanical, hydraulic, air and electrically operated jacks. The Automotive Division of WPB, under whose jurisdiction this new order, L-322, will be administered, will thus reduce the number of jack models from 403 to 22 and the number of sizes from 1,825 to 864. There are about forty jack manufacturers in the industry with an annual sales of volume of about \$30,000,000.

Two new schedules of permitted models and sizes are included in the order which restricted manufacture, after November 1, 1943, to the simplified and standardized capacities, sizes and models indicated in the schedules. In order to ensure equitable distribution to essential civilian users, it is also ordered that 25 per cent of each month's non-military production of 3, 5, 8, 13 and 20-ton portable upright hydraulic jacks is to be set aside and held available for delivery against orders rated on forms WPB-54 and WPB-547.

## ONE MAN...

## now does the WORK of THREE!

with

**ANTHONY**  
HYDRAULIC

## TAILGATE LOADER!

CAPACITIES 750 LBS. to 1500 LBS.

★ SOLVES MANPOWER SHORTAGE!

★ PAYS FOR ITSELF!

• MOUNTS ON TRUCKS  
NOW IN SERVICE OR  
ON NEW TRUCKS



With an Anthony "Tailgate Loader" one man easily places heavy awkward crate on tailgate. . . .

. . . by hydraulic lift, controlled by one lever, one man raises heavy, awkward crate to floor level. . . .

Tailgate automatically stops flush with body floor, permitting one man to easily and safely load heavy, awkward crate.

• SAVES MANPOWER! One man now does what three or more formerly did.  
• CUTS LOADING AND UNLOADING TIME! Trucks are loaded and unloaded faster — keeps them on the move.  
• REDUCES PERSONNEL ACCIDENTS! Loads are lifted to body or lowered to ground by powerful hydraulic hoist mechanism controlled by one convenient lever.

• REDUCES ACCIDENTAL DAMAGE TO VALUABLE MERCHANDISE! No skids, chains or cables to break or slip. Minimizes your damage losses.



Anthony "ZB" Hydraulic Platform Hoist makes inexpensive dump body out at platform, stake and grain bodies.



**ANTHONY COMPANY, INC.**  
STREATOR, ILLINOIS

Write or wire today for complete information. You'll be surprised at the low price. Address Department J-34.



## ROGERS TRAILERS

ROGERS BROTHERS CORP., ALBION, PENNA.

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**Buy A Share  
In America**  
☆

Lend a  
**HELPING HAND**  
with your  
**WAR  
BONDS**



## Your Highway Story Should Be Dramatic

(Continued from page 60)

point of the publicity man and is generally acceptable to the small newspapers as each of them is able to publish a "Special" story under its own date line. Another angle concerning the small-town newspaper is brought out by the experience of the chairman of one of our state highway commissions a few years ago. Finding the newly elected legislature, predominantly of his own political faith, very hostile to the commission despite several years of remarkable progress by the state highway department, he naturally began to wonder what the public must think if the legislature was so hostile, and what was wrong with the department's public relations program. Investigation disclosed that there had been too much straight reporting of cold facts to the newspapers, particularly to the smaller papers, leaving almost untouched the dramatic local story which the public would have understood. Information of the kind a state highway department has to offer to the public must be presented in terms of local interest. People will be really interested in a grade-separation construction project, if the need for that project is presented to them in terms of the tragic death of a fellow townsman, or of the loss to Farmer Jones of his hired man and a truck-load of pigs in a smash-up at the grade crossing. People care about what affects them and the people they know; by and large, they are not interested in statistics and remote cold facts about a vague highway program.

The businessmen along your highways, and that includes the farmers, owners of roadside stands, gas stations, and the increasing number of roadside industries, as well as the regular users of a particular highway, are especially interested in knowing when you are going to close the road completely so that the contractor may start work; or when travel is to be so restricted by one-way traffic that business is going to be affected, and perhaps shut down.

A sensible method of taking care of a situation of this type was used in Massachusetts. The Mohawk Trail, one of the famous scenic routes of the east, extending from Greenfield to North Adams, needed a general overhauling, widening, larger drainage structures, and the elimination of some sharp curves. A project 2 or 3 miles in length was awarded one year, another such project the next year and plans were made for another the third. Each of these caused much of the traffic to detour entirely from the road. The highway engineers then realized that the very large roadside business was being ruined by this continued diversion of traffic from the highway. Accordingly, they visited all large and small business establishments throughout the length of the Trail and discussed the advisability of closing the road for its entire length for one construction season and awarding enough contracts to complete the remaining improvements all in one year. The response was almost unanimously favorable, the work was finished in one year, and the Mohawk Trail since then has been safe, scenic and a business success. This kind of consideration is good public relations.

### Public Relations vs. Publicity

Let us consider those terms public re-

lations and publicity. Public relations includes publicity, but a publicity program does not necessarily mean good public relations. No state department serving the public can avoid public relations. Its job is to see to it that those public relations are good, rather than bad. You may pack your newspapers, large and small, daily and weekly, with bits of information or long stories about the work your department is doing, you may sponsor radio programs, and send out speakers, and still find the public is hostile to what you are endeavoring to do. Why? Simply because the state highway department employees with whom the public comes in contact, the men who represent the highway department to them, are lacking in courtesy and consideration, or do not discuss their work freely and diplomatically.

Here the engineer can borrow something of the politician's approach. Your successful politician is always thinking of his own good public relations with every man he meets. He is always gracious and willing to discuss the problem

of his constituents. If the highway engineer will take a similar attitude with the public, the small property owner, the large estate owner, the business man and the farmer along the state highways, and see that every member of his staff, down to the patrolman, is fair, honest, and courteous, he will establish a better feeling and secure greater cooperation from the public than can be obtained by any number of agate lines in the papers!

### Conclusion

The public wants to know what you are doing; the public wants good public relations with its public servants; and the highway department needs, perhaps now more than ever before, the best possible public relations to insure an appreciative understanding and active support of its program of service to the communities in its state, to increase the pleasure and reduce the cost of highway travel and transportation.

From a paper presented before a Group Meeting of the Public Relations and Publicity Committee, American Association of State Highway Officials, at Chicago, Ill., December 2, 1943.

## Ready for your present and future construction planning

Blaw-Knox Steel Forms are designed for speed and economy in construction, and contractors have for many years utilized our specialized engineering service to plan their jobs.

Current construction work of a sufficiently urgent nature can be served, and long range planning for the proper handling of future jobs can be aided by experienced Blaw-Knox engineers.

The engineering facilities and services extended by Blaw-Knox form engineers are prized by all who have taken advantage of them. This service is offered in the interest of engineering progress and is free from any charge or obligation.

## BLAW-KNOX STEEL FORMS

BLAW-KNOX STEEL FORMS are used for the construction of  
TUNNELS WALLS SEWERS DAMS BRIDGES PIERS  
CONDUITS ROADS SEWAGE DISPOSAL PLANTS...

... and other varieties of concrete construction

**BLAW-KNOX DIVISION of Blaw-Knox Co.**

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**EXPECTED LIFE 3 MONTHS**

**EXPECTED LIFE 6 MONTHS**

**STODDY SELF-HARDENING MAKES THE DIFFERENCE!**

ABOVE are two reclaimed rollers, taken from the same tractor, which are identical in every way but one. The upper roller was rebuilt to size with high carbon electrodes alone before being placed in service. The lower roller, also rebuilt in the same manner, carried an additional protective layer of Stoddy Self-Hardening over the high carbon build-up.

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Hard-facing can be applied either of two ways:  
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\*The preliminary high carbon build-up can be eliminated if Stoddy Self-Hardening is applied before excessive wear has occurred on the roller.



Have you received your copy of Stoddy Specialization Sheet? They illustrate and describe dozens of equipment-saving applications thru the use of hard-facing—sent free on request.

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**STODDY HARD-FACING ALLOYS**

*Stop wear... Eliminate Repair*



# Peoria County Plans Post-War Road Work

## Construction Program Laid Out; Preliminary Work Is Under Way to Prepare for Highway Improvements

By EVERETT J. WENDELL, Superintendent of Highways, Peoria County, Illinois, Highway Department

† EARLY in 1942 the Peoria County, Illinois, Highway Department realized that new construction would have to be postponed until the end of the war and decided to formulate a long-range and sensible post-war construction program. We believed then, and still do, that some Federal funds will be made available to tax-collecting bodies to supplement their own funds in carrying on a large public-works construction program. We decided to complete as much of our preliminary work as possible and, in case these funds were not forthcoming, to use as much of our own funds as we could accumulate during the war period. It now appears that it may be possible to start some of this construction before the end of the war, if restrictions on some materials are somewhat relaxed.

Peoria County has three sources of funds: first, the regular county highway tax; second, the county's share of the motor-fuel tax; and third, Section 15D refund money. This latter results from a law passed in 1931 permitting the state to repay to the counties one half of the money the counties had advanced for the construction of state-aid roads under Section 15D as the state's share of the cost of construction. These funds may be used for both construction and maintenance, with the exception of the 15D refund money which can be used only for construction. The total income for this Department averages approximately \$425,000 per year.

We were asked by the Federal Government early in 1942 to submit a proposed capital improvement program, which we did, amounting to \$3,067,200. At that time, we considered it our post-war program. Since then, some of the individual sections and bridges have been constructed and other roads and bridges added.

### The Post-War Program

The following is approximately our immediate post-war program:

Roads to be reconstructed and graveled.....	62.25 miles
Roads already surveyed and designed.....	85 miles
Right-of-way secured.....	14.5 miles
Bridges to be constructed.....	24
Bridges designed.....	5
Roads ready for black-top.....	100 miles

It is our intention to complete surveys and plans, design bridges and culverts, secure necessary right-of-way, move all fences back to the new right-of-way lines, and move power and telephone lines, in readiness for the start of construction.

The greater portion of our present work is the acquisition of right-of-way, for in addition to securing right-of-way on our own county roads, we also secure and purchase right-of-way for the State Highway Department whose post-war program calls for the acquisition of approximately \$500,000 of right-of-way in Peoria County.

### Present County System

The present county highway system in Peoria County consists of about 303 miles of roads. The state highway system is 163 miles and the township system, 642 miles. The majority of the roads serve agricultural districts as well as a number of coal mines. The county roads carry from 50 to 2,700 vehicles per 24-hour day, with an average of about 200 a day. Approximately 30 miles of the county system is of bituminous macadam, 100 miles have been reconstructed and graveled, ready for bituminous macadam, and about 62.25 miles will be reconstructed and graveled in the period immediately following the end of the war. The balance of the roads in the county system are graveled and are of low-type construction.

It is planned to black-top or dustproof all of the county system when finances permit, and other roads will be added to the system if an increase in traffic warrants.

### Other County Problems

Another item to consider for the post-war period is that of replacing worn-out equipment when new equipment becomes available. This will cost a considerable amount of money and will cut down the

amount available for construction. Personally I am hoping that some arrangement will be made whereby we can secure some of the Government-owned equipment which it no longer needs.

To date we have been fortunate in securing repairs for our machines and have been able to keep this equipment in a fairly satisfactory state for service. Our roads have had the usual maintenance and will not need an unusually large expenditure of money for extraordinary maintenance after the war. We have also been fortunate in securing nearly all of the road supplies needed for maintenance.

A few of our employees have left for service in the armed forces or for other work, but as a whole our organization is almost intact, with the exception of the loss of the two top engineers and two experienced and capable foremen. The loss of the Construction and Maintenance Engineers has left the Department with only the Superintendent of Highways and one engineer to carry on the regular maintenance work and

to proceed with post-war plans. However, progress is being made, and we expect to be able to start a large construction program when that becomes possible.

### Prevention of Fires In Welding and Cutting

The chief causes of and the means preventing fires from welding and cutting operations are discussed in a page pocket-size booklet published by the International Acetylene Association. It is written in a simple, clear style and the accompanying illustrations emphasize the main points in the text. A copy of this booklet, "Preventing Welding and Cutting Fires", should be in the hands of every welding and cutting operator.

Copies of the booklet will be supplied in reasonable quantities without charge upon application to the International Acetylene Assn., 30 East 42nd St., New York 17, N. Y. Just mention CONTRACTORS AND ENGINEERS MONTHLY.

## NOT NEW

We emphasize the fact that the Novo Diaphragm Pump is not new! It was offered to the Trade in 1938. Since then, it has proven itself under all normal working conditions, and is today recognized as the leader in the Diaphragm Pump field.

This Pump is thoroughly modern, offering the following features:

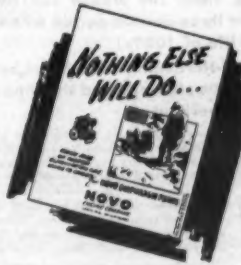
**ECCENTRIC DRIVE** which eliminates moving parts, thus eliminating trouble. Over-all dimensions and dead-weight are greatly reduced for handling ease. All gears are enclosed for protection and safety, and run in an oil-bath for constant lubrication.

**TRIPL-LIFE DIAPHRAGM** which improves service and cuts down work stoppages. By actual test, the Tripl-Life Diaphragm outlasts 3 to 4 ordinary Diaphragms.

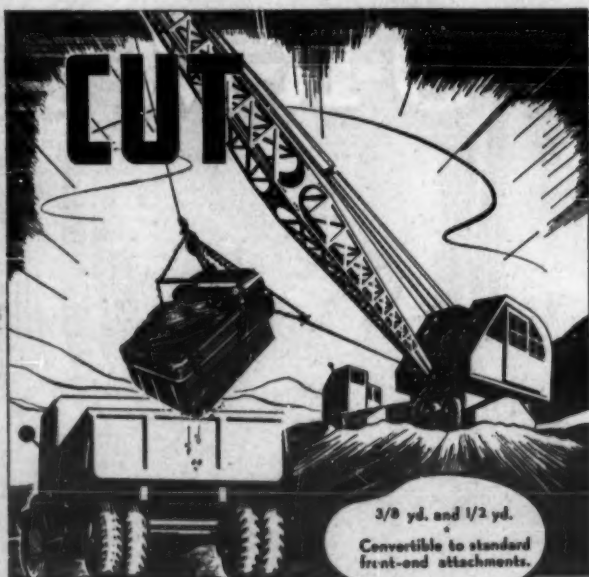
**ARM-SIZE CLEAN-OUT** which provides easy cleaning. All Pumps must be cleaned — Novo made it easy. You remove the Clean-Out-Plate with a stone or pipe (No wrenches needed). The Clean-Out-Hole is arm-sized, giving access to the Diaphragm chamber and both Valves from a single opening. It takes just 3 minutes to thoroughly clean a Novo Diaphragm Pump.

No, the Novo Diaphragm Pump is not new because it has been time-tested by 5 years of field service. Modern, not new, is the word for it.

For the latest Diaphragm Pump Bulletin, write to the Novo Engine Co., 216 Porter Street, Lansing, Michigan. It contains the latest information and specifications and it's free for the asking.



**NOVO**  
ENGINE COMPANY LANSING, MICHIGAN



Cut job-time — travel-time between jobs — initial and maintenance costs . . . employ MICHIGAN Mobile Draglines — Operator-approved for driving ease and non-fatiguing Air Controls. Ask for Bulletin D.

**MICHIGAN**  
POWER SHOVEL COMPANY  
BENTON HARBOR MICHIGAN







U. S. Army Signal Corps Photo  
Torsapulls and Carryall scrapers being used by the U. S. Aviation Engineers to build an aerodrome in North Africa.

## Fifteen Magazines Built for the Navy

(Continued from page 55)

with mortar.

The forms were stripped from the outside in four days, the holes caused by the ties were immediately filled, and curing with water started and continued for seven days. The inside forms were removed in fourteen days.

### Protection

The inside of the completed magazines are painted with a waterproof paint and the outside given four layers of membrane waterproofing mopped with hot asphalt. Sewer tile with open joints was laid one-third the way up the side of the magazine, leading to seep holes in the face of the end wall at the front.

The final work was the covering of the magazine with local stone, using a dragline, and leaving the material about as it dropped, without dressing.

## New Universal Joints For Post-War Service

Enough of the new Bendix-Weiss Constant Velocity universal joints to equip nearly half a million United Nations multiple-drive vehicles have been produced by the Bendix Aviation Corp., South Bend, Ind., it has been announced. This Bendix-Weiss universal joint, embodying basically new principles with important practical advantages, including constant angular velocity of the driven member and elimination of sliding splines, is the culmination of ten years of research and tests, and was perfected by the company's engineers before America's entry into the present conflict.

Universal joints, prior to this new development, had been based mainly upon progressive variations of the first cross-type Cardan universal joint. This type of joint served the peacetime automotive industry satisfactorily in many applications but was not suited to the front-wheel drive of multiple-drive vehicles. The new Bendix-Weiss universal joint, in which the cross-type connecting member has been discarded, consists basically of but nine parts: two forged yokes, five steel balls, and two steel pins. The two shafts with cupped yoke-shaped members containing steel balls are located on the front axles and transmit torque from the differential to the driving wheels. The action of this joint permits it to do its job at a constant velocity, minimizing load fluctuations and resulting loss of power, and the rolling ball construction permits a constant speed to be applied to the driving wheels.

Although the Bendix Corp. has been speeding up the output of these joints

for the exclusive use of the armed forces, in various types of multiple-drive vehicles and in hydraulic devices aboard Naval vessels, the company is looking forward to the post-war application of this new universal joint to the trucks, cars and other automotive equipment of the future.

# CUT Over-all Placing COSTS



## with a MALL VIBRATOR

1 1/2 H. P. UNIT  
GASOLINE POWERED

★Immediate delivery on Gasoline Powered 1 1/2 H.P., and wheelbarrow or round base mounted 3 H.P. units on suitable priority.

BACK  
THE ATTACK  
BUY  
WAR BONDS

- ★For their size, MALL Vibrators place more concrete per hour than any other vibrator.
- ★They place a stiffer mix with important savings in cement, sand and labor.
- ★MALL vibrated concrete assures a better bond with reinforcement . . . is free from honeycombs and voids . . . permits earlier stripping of forms . . . and makes a stronger, water-tight job.
- ★MALL Vibrators are easily portable, use very little fuel, are easy to start, and require little attention.
- ★MALL Vibrating elements are ruggedly constructed for long service with welded, special metal tips that withstand abrasive action.
- ★Variable speed gasoline engine operates 8 other tools easily interchangeable with the vibrating element.

Write at once for full details.

## MALL TOOL COMPANY

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## INDEX TO ADVERTISING

Aeroli Burner Co., Inc.	35
Agerstrand Corp.	25
Allied Steel Products, Inc.	39, 58
Allis-Chalmers Mfg. Co.	35
American Cable Division	31
American Steel Scraper Co.	49
Anthony Co., Inc.	64
Armco Drainage Prod. Assn.	56
Associated Equipment Distributors	63
Austin-Western Road Machy. Co.	20
Bally Vibrator Co.	47
Barber-Greene Co.	41
Barco Mfg. Co.	8
Bartlett Mfg. Co.	14
Beebe Bros.	38
Ben-Hur Mfg. Co.	61
Bethlehem Steel Co.	45
Bicknell Mfg. Co.	39
Blaw-Knox Division	65
Brooks Equip. & Mfg. Co.	60
Bros Boiler & Mfg. Co., Wm.	11
Buckeye Traction Ditcher Co.	46
Bucyrus-Erie Co.	13
Butler Bin Co.	32
Carey Mfg. Co., Philip	23
Carver Pump Co.	63
C. H. & E. Mfg. Co.	42
Chicago Pneumatic Tool Co.	39
Cleaver-Brooks Co.	24
Cleveland Rock Drill Co., The	51
Cleveland Tractor Co.	27
Clyde Iron Works, Inc.	36
Coast Metals, Inc.	61
Complete Machy. & Equip. Co., Inc.	31
Concrete Chemical Co.	29
Conner Construction Co.	59
Cummer & Son Co., The F. D.	8
Davenport Besler Corp.	26
DeSoto Foundry, Inc.	60
Detroit Diesel Engine Div., General Motors	40
Electric Tamper & Equip. Co.	62
Euclid Road Machy. Co.	28
Fiske Bros. Refining Co., Lubriplate Div.	57
Flexible Road Joint Mach. Co.	21
Fulton Bag & Cotton Mills	48
Gallon Iron Works & Mfg. Co.	12
Gardner-Denver Co.	53
Geopres Wringer, Inc.	59
Giffin Wellpoint Corp.	40
Hales Mfg. Co., Inc., George	23
Hayward Co., The	45
Hell Co., The	54, 55
Hercules Steel Prod. Co.	22
Hetherington & Berner Inc.	11
Hobart Bros. Co.	48
Hough Co., The Frank G.	15
Iowa Mfg. Co.	44
Jaeger Machine Co., The	33
Kochring Co.	49
LaCrosse Trailer & Equip. Co.	27
LeRoi Company	61
LeTourneau, Inc., R. G.	16
Lewis Equipment Co., H. W.	24
Lidgerwood Mfg. Co.	46
Lima Locomotive Works, Inc.	38
Link-Belt Speeder Corp.	21
Linn Mfr. Corp.	67
Lister-Blackstone, Inc.	12
Littleford Bros., Inc.	34
Mall Tool Co.	67
Marion Steam Shovel Co.	42
Marlow Pumps	13
Martin Machine Co.	52
McCauley-Ruddock Tagline Corp.	56
McKernan-Terry Corp.	23
Michigan Power Shovel Co.	66
Mondle Forge Co., Inc.	15
Murphy Diesel Co.	33
Novo Engine Co.	66
Onan & Sons, D. W.	10
Osgood Co.	17
Owen Bucket Co., The	58
Parsons Company	25
Pettibone Mulliken Corp.	26
Raybestos Div., Raybestos-Manhattan, Inc.	14
Richmond Screw Anchor Co., Inc.	56
Robins Conveyors, Inc.	32
Rockford Drilling Machine Div., Borg-Warner Corp.	58
Rodgers Hydraulic Inc.	50
Roeth Vibrator Co.	9
Rogers Bros. Corp.	59, 64
Sand's Level & Tool Co.	57
Sasgen Derrick Co.	43
Schramm Inc.	48
Seaman Motors	5
Servicised Products Corp.	33
Siebling Mfg. Co.	20
Sinclair Refining Co. (Inc.)	10
Smith Engineering Works	43
Standard Oil Co. of Calif.	52
Sterling Machinery Corp.	42
Sterling Wheelbarrow Co.	54
Stoody Co.	65
Texas Co., The (asphalt)	3
Texas Co., The (lubricants)	6, 7
They Shovel Co.	9
Timber Structures, Inc.	47
Tuthill Spring Co.	41
Universal Power Corp.	51
Viber Co.	28
Vulcan Tool Mfg. Co.	34
Walter Motor Truck Co.	29
Warren-Knight Co.	16
Wellman Engineering Co., The	55
Wenzel Tent & Deck Co., H.	18, 19
White Mfg. Co.	17
Wisconsin Motor Corp.	39
Yaun Dragline Buckets & Mfg. Plant	62

## On The Inter-American Highway



A large fleet of LINN HAFTRAKS solves the problem of removing rock and rubble.

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MORRIS, NEW YORK

## LET YOUR HEART DECIDE



You can cheer some lonely soldier far from home—because USO is one of 17 major war relief agencies participating in the National War Fund. Give once for all these and our community's needs. Give generously. The need is great.

**NATIONAL  
WAR FUND**



# Contractors and Engineers Monthly



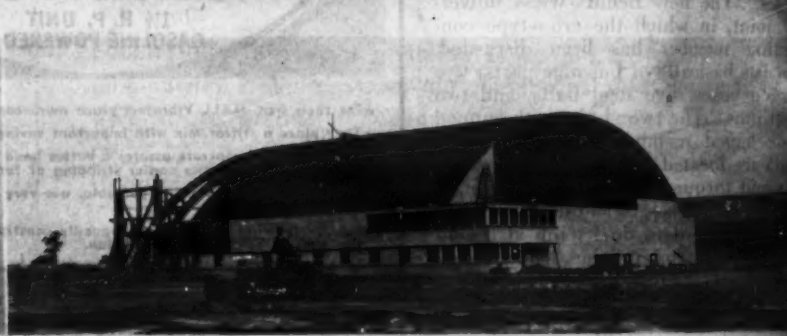
Public Roads Administration Photos  
Above, falsework for the main 190-foot river span of the Kiskatinaw Bridge, just before the spring flood washed away five bents of the falsework as well as the detour bridge. Above, right, the completed structure on the Alaska Highway, showing the 9-degree curve to avoid heavy excavation. See page 31.



The special truck of Dallas County, Ala., used to transport tools, materials and the bridge crew. The portable pile driver, built by the county, is towed on the two-wheel trailer anywhere in the county. See page 2.



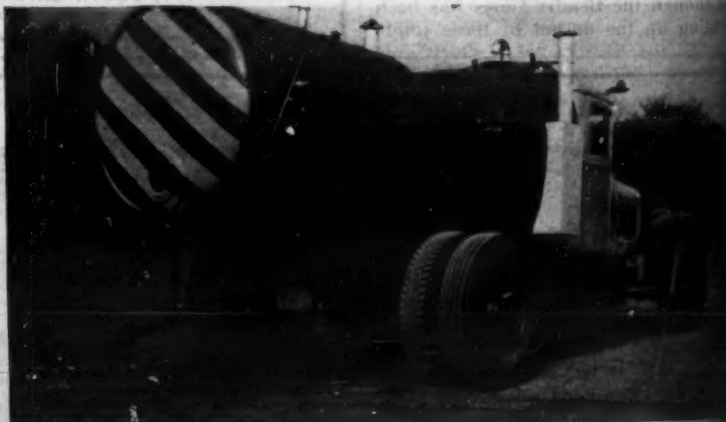
The front bay of a new laminated-wood arch hangar for Fairchild Aircraft has a rigid wood truss, assembled with ring connectors, built in for added stability. Right, grading around the nearly completed hangar. See page 17.



At left, the plant set-up which prepared the mix for a maintenance surfacing contract in Kentucky, awarded by the State Department of Highways. See page 9.

Below, dropping a batch every 30 seconds, this Koechling 34-E paver working on runways at a new southern airport averaged 2,100 feet of 25-foot wide 9-7-7-9-inch slab in 12 hours. See page 2.

C. & E. M. Photo



Equipment built in the Division 12 shops of the Ohio Department of Highways has done much to reduce costs. Top photo, a booster truck for bituminous work has two 500-gallon water tanks mounted on a 1936 White chassis. Lower photo, a 7 x 12 flatbed trailer for hauling light equipment saves high rental charges on standard heavy-duty trailers. See page 11.